Drainage Reports
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TRAFFIC IMPACT ANALYSIS

SWC 99th Place and McDowell Mountain Ranch Road

Scottsdale, Arizona

Prepared for:

SCW Holdings, LLP

Kimley»Horn

TRAFFIC IMPACT ANALYSIS

SWC 99th Place and McDowell Mountain Ranch Road Scottsdale, Arizona

Prepared for:

SCW Holdings, LLP
10405 E. McDowell Mountain Ranch Road
Scottsdale, Arizona 85255

Prepared By:

Kimley-Horn and Associates, Inc.
7740 North 16th Street, Suite 300
Phoenix, Arizona 85020

291350000
May 2019

Kimley»Horn

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1.0 EXECUTIVE SUMMARY

1.1 INTRODUCTION

This report documents a traffic impact analysis performed for a proposed senior living facility located on the south side of McDowell Mountain Ranch Road at 99th Place in Scottsdale, Arizona. The site will include assisted living and congregate care facility land uses and is anticipated to be built out by 2021.

1.2 REPORT PURPOSE AND OBJECTIVES

Kimley-Horn and Associates, Inc., has been retained by SCW Holdings, LLP to perform the traffic impact analysis for the proposed development.

The purpose of this study is to address traffic and transportation impacts of the proposed development on surrounding streets and intersections. This traffic analysis was prepared based on criteria set forth by the City of Scottsdale Transportation Impact and Mitigation Analysis, Category II. The specific objectives of this study are:

- To evaluate lane requirements on all existing roadway links and at all existing intersections within the study area;
- To determine future level of service (LOS) for all existing intersections within the study area and recommend any capacity-related improvements;
- To determine necessary lane configurations at all new driveways within the proposed development in order to provide acceptable future levels of service;
- To evaluate the need for auxiliary lanes at all study area intersections; and
- To evaluate the need for future traffic signals.

1.3 PRINCIPAL FINDINGS AND RECOMMENDATIONS

The proposed development is expected to generate 340 daily trips, with 14 trips occurring in the AM peak hour and 31 trips occurring in the PM peak hour. To ensure that the estimate of the traffic impacts is the maximum that can be expected, it is assumed that the site will be 100 percent occupied upon buildout in 2021.

- The signalized intersection of Thompson Peak Parkway and McDowell Mountain Ranch Road is expected to operate at an acceptable level of service in 2021, with the exception of the southbound left-turn lane and the eastbound thru lane in the PM peak period.
- The unsignalized intersection of 98th Street and McDowell Mountain Ranch Road and the site driveways are expected to operate at an acceptable level of service in 2021.
- It is recommended that a continuous two-way left-turn lane be striped to provide access for the left turning movements into the site driveways and to maintain access to the existing private streets on the north side of McDowell Mountain Ranch Road.

- It is recommended that sight triangles be provided at all site access points to give drivers exiting the site a clear view of oncoming traffic. The landscaping within sight triangles must not obstruct drivers' views of the adjacent travel lanes. Sight distance should be provided at all street intersections and where driveways intersect with streets per Section 5-3.123 Part D of City of Scottsdale Design Standards & Policies Manual.

2.0 PROPOSED DEVELOPMENT

2.1 SITE LOCATION

The proposed development, a senior care facility, is located on the south side of McDowell Mountain Ranch Road at 99th Place in Scottsdale, Arizona. The project location is shown in **Figure 1**.

2.2 LAND USE AND SITE PLAN

The overall development consists of an assisted living and congregate care facility. The total site area is on approximately 5.3-acres±. **Table 1** illustrates the land use of the proposed development.

Table 1. Land Use

General Description	ITE Land Use	Size
Congregate Care Facility	253	139 DU's
Assisted Living	254	22 Beds

The layout of the site is illustrated in **Figure 2**.

2.3 SITE ACCESSIBILITY

The site is accessed locally via McDowell Mountain Ranch Road. Regional access is expected to be provided by the Pima Freeway (Loop 101) and by the other arterial streets in the vicinity such as Thompson Peak Parkway, Bell Road and Frank Lloyd Wright Boulevard.

2.4 SITE CIRCULATION

The site plan is shown in previously referenced **Figure 2**. The site consists of two full access driveways. Driveway D1 is located approximately 470 feet east of 98th Street on the south side of McDowell Mountain Ranch Road. Driveway D2 aligns with an existing driveway on the north side of McDowell Mountain Ranch Road. Driveway D2 is approximately 150 feet east of Driveway D1 and approximately 620 feet east of 98th Street on the south side of McDowell Mountain Ranch Road.

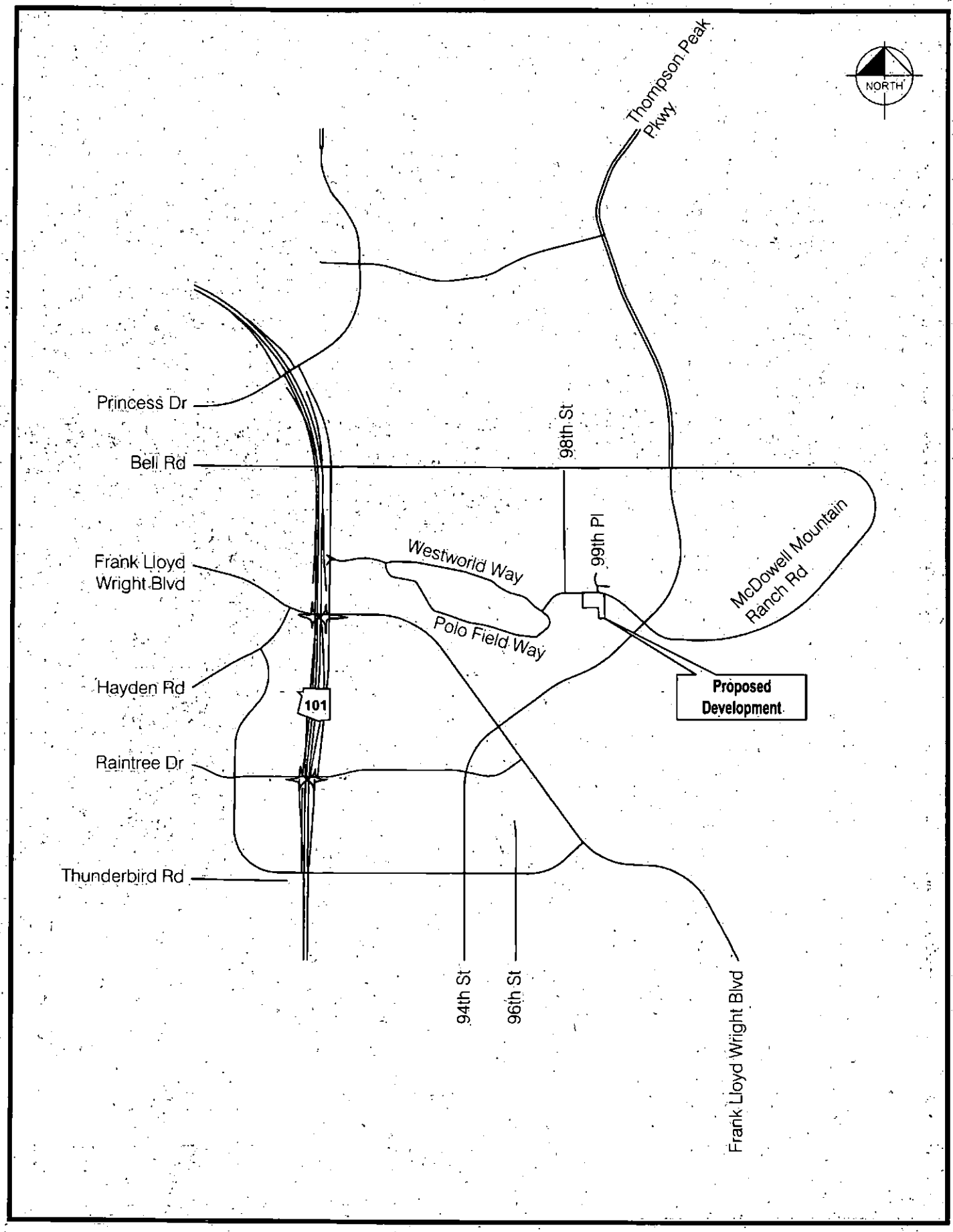

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Figure 1
Vicinity Map

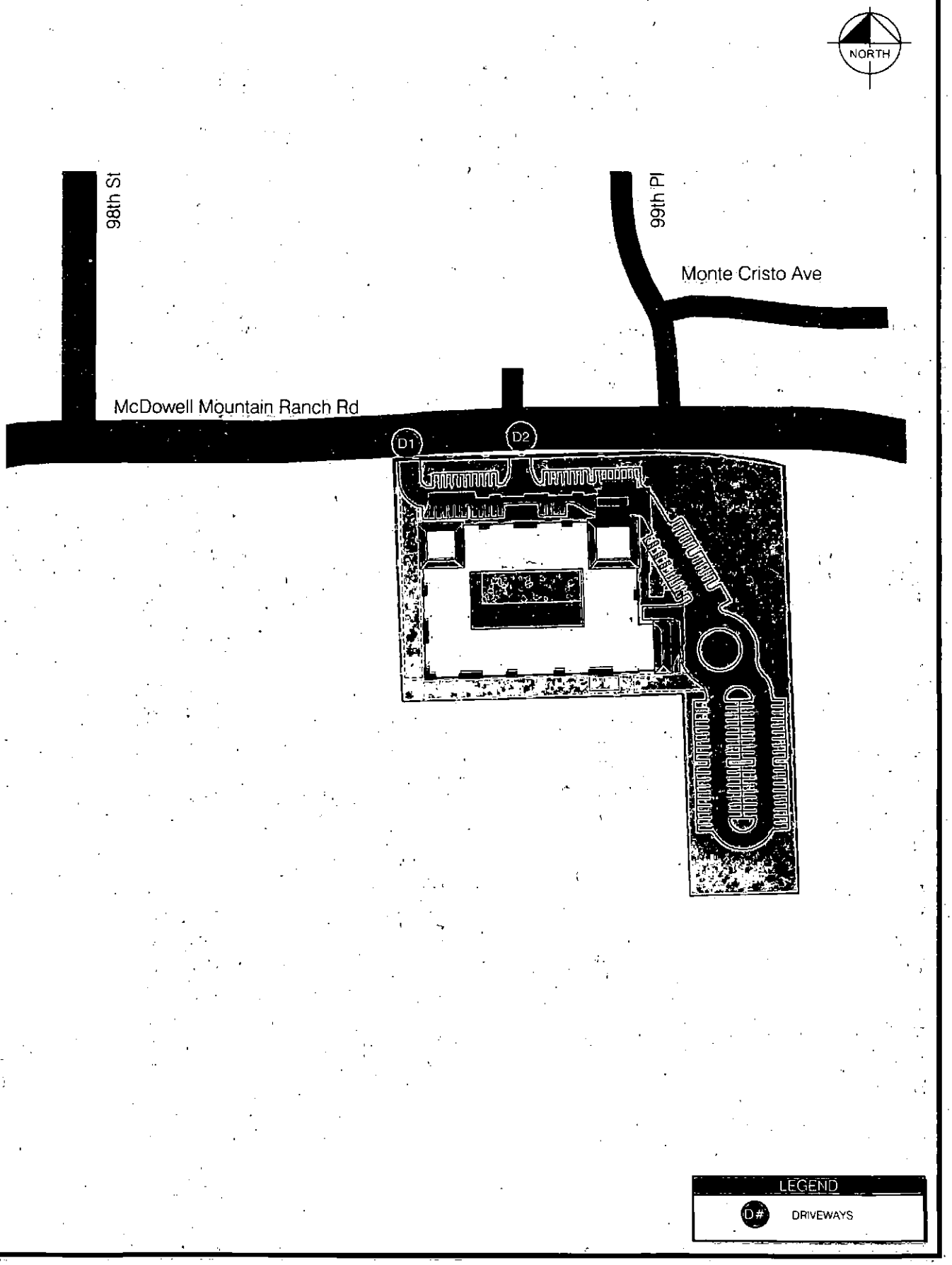

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Figure 2
Site Plan

3.0 STUDY AREA

3.1 STUDY AREA

The study area includes the intersection of McDowell Mountain Ranch Road with 98th Street and Thompson Peak Parkway as well as the site driveways along McDowell Mountain Ranch Road.

3.2 ADJACENT LAND USE

The area in the vicinity of the site contains a mix of land uses that is primarily comprised of residential, recreation uses, a high school and middle school, commercial and office land uses. Single-family residential housing exists north and northeast of the site. A new condominium residential development is currently under construction on the northeast corner of 98th Street and McDowell Mountain Ranch Road. The driveway on the east side of the condominium development aligns with Driveway D2. West World of Scottsdale is located approximately a quarter mile west of the site. Notre Dame Preparatory High School is located on the southwest corner of 98th Street and Bell Road, northwest of the site. The Desert Canyon Middle School is located south of the intersection of McDowell Mountain Ranch Road and 102nd Place, southeast of the site. A business park, is located northwest of the site, bounded by the Pima Access Road to the west, Bell Road to the north, 94th Street to the east and West World Way to the south.

The Loop 101 is located approximately 1.5 miles west of the site.

4.0 EXISTING CONDITIONS

4.1 PHYSICAL CHARACTERISTICS

The existing roadway network within the study area includes McDowell Mountain Ranch Road, Thompson Peak Parkway, and 98th Street. The existing intersection lane use and traffic control is shown in **Figure 3**.

McDowell Mountain Ranch Road currently extends east-west with two lanes in each direction with a two-way left turn lane in the vicinity of the site. Curb, gutter and sidewalk are in place on the north side of the roadway in the vicinity of the site. The posted speed limit is 30 mph. The City of Scottsdale classifies McDowell Mountain Ranch Road as a major collector roadway west of Thompson Peak Parkway and a minor arterial roadway east of Thompson Peak Parkway.

Thompson Peak Parkway currently extends northeast-southwest in the vicinity of site with two lanes in each direction with a raised median. Curb, gutter and sidewalk are in place on both sides of the roadway in the vicinity of the site. The posted speed limit is 45 mph. The City of Scottsdale classifies Thompson Peak Parkway as a minor arterial roadway.

98th Street currently extends north-south with one lane in each direction in the vicinity of the site. Curb, gutter, and sidewalk exist on the east side of 98th Street in the vicinity of the site. The posted speed limit is 35 mph. The City of Scottsdale classifies 98th Street as a major collector roadway.

The existing intersections analyzed in this report are Thompson Peak Parkway/McDowell Mountain Ranch Road (signalized), with protected left-turn phasing in all directions, and 98th Street/ McDowell Mountain Ranch Road (stop-controlled in the southbound direction).

4.2 TRAFFIC VOLUMES

Turning movement counts were collected at the intersections of Thompson Peak Parkway/McDowell Mountain Ranch Road and 98th Street/ McDowell Mountain Ranch Road on Thursday, April 11, 2019. The counts were performed between 7:00 AM and 9:00 AM and between 4:00 PM and 6:00 PM. The results of these counts are shown in **Figure 3**. A copy of the counts is attached in the **Appendix.**

4.3 LEVEL OF SERVICE

The LOS at the intersections of McDowell Mountain Ranch Road with Thompson Peak Parkway and 98th Street were evaluated using the traffic counts collected on Thursday, April 11, 2019. The LOS for the intersections were evaluated using the *Highway Capacity Manual 6th Edition* methodology for unsignalized intersections and *Synchro 10* methodology for the signalized intersection with signal timing information provided by the City of Scottsdale. The existing intersection geometry and control, shown in **Figure 3**, was used to obtain the LOS. The results of this analysis are shown in **Table 2** and **Table 3**. LOS worksheets and signal timing assumptions are included in the **Appendix**.

Table 2. Existing Level of Service: Unsignalized Intersection

Intersection	NB			SB			EB			WB		
	L	T	R	L	T	R	L	T	R	L	T	R
98th Street and McDowell Mountain Ranch Road												
AM Peak	-			B			A			-	-	-
PM Peak	-			B			A			-	-	-

The unsignalized intersection operates at an acceptable LOS.

Table 3. Existing Level of Service: Signalized Intersection

Intersection	NB			SB			EB			WB			Intersection
	L	T	R	L	T	R	L	T	R	L	T	R	LOS
Thompson Peak Parkway and McDowell Mountain Ranch Road													
AM Peak	D	C	A	D	D	A	D	D	B	D	C	A	C
PM Peak	D	C	A	E	D	A	D	E	B	D	C	A	C

The signalized intersection operates at an acceptable level of service with the exception of the southbound left-turn and the eastbound thru movement in the PM peak period.

4.4 CRASH DATA

Crash data at the intersection of McDowell Mountain Ranch Road with Thompson Peak Parkway and 98th Street was obtained from the City of Scottsdale from January 2013 to October 2018. The crash data is included in the **Appendix**.

Based on the crash data obtained from the City of Scottsdale, there were 46 crashes reported at the intersection of McDowell Mountain Ranch Road and Thompson Peak Parkway over the five year period. There were two non-incapacitating injuries. One non-incapacitating injury crash was a rear end crash (front to rear) and one front to side angle crash. One single vehicle possible injury crash occurred, and two other single vehicle crashes occurred with no injury. The remaining crashes were noninjury crashes. There were eleven front to side non-left turn angle crashes, four left turn crashes, 15 front to rear crashes, two head-on crashes, seven same direction sideswipe crashes, one opposite direction sideswipe crashes, and one rear-to-side crashes. The intersection of McDowell Mountain Ranch Road and Thompson Peak Parkway ranks 102 out of 202 intersections based on the number of collisions occurring at the intersection. The average collision rate in Scottsdale is 0.65 collisions per million vehicles. The intersection of McDowell Mountain Ranch Road and Thompson Peak Parkway has a collision rate less than the average of 0.55 collisions per million vehicles entering the intersection.

There were three crashes reported at the intersection of 98th Street and McDowell Mountain Ranch Road over the five year period. One possible injury crash occurred from a rear end, front to rear crash. There were two noninjury left turn crashes.

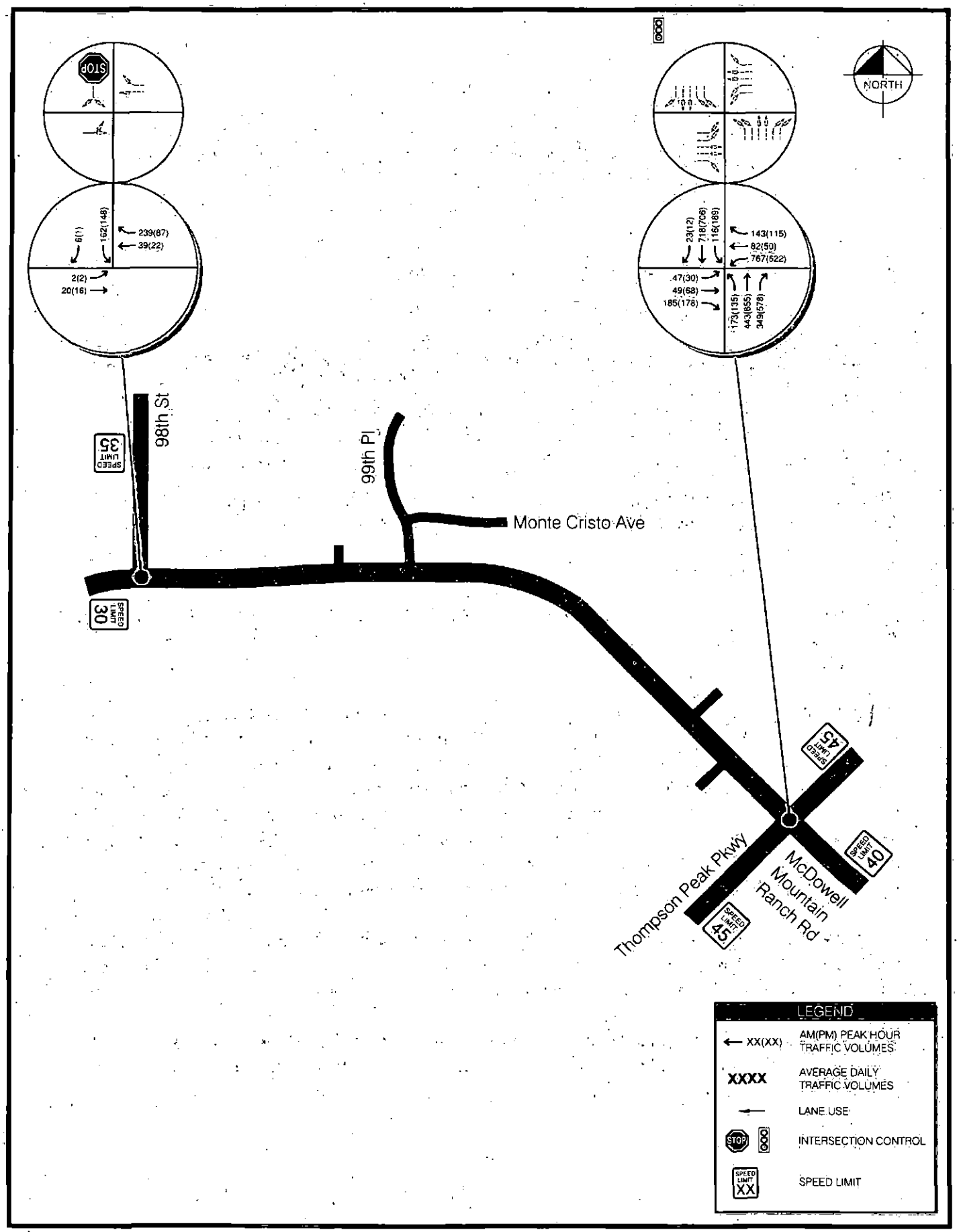

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Figure 3
Existing Conditions

5.0 PROJECTED TRAFFIC

5.1 SITE TRAFFIC FORECASTS

5.1.1 TRIP GENERATION

The Institute of Transportation Engineers' (ITE) *Trip Generation, 10th Edition,* was used to obtain daily and peak-hour trip generation rates and inbound-outbound percentages, which were then used to estimate the number of daily and peak hour trips that can be attributed to the proposed development. The trip generation characteristics of the site are summarized in **Table 4**.

Table 4. Project Trip Generation

Land Use	ITE Code	Quantity	Units	Daily Total	AM Peak			PM Peak		
					In	Out	Total	In	Out	Total
Congregate Care Facility	253	139	DUs	282	6	4	10	13	12	25
Assisted Living	254	22	Bed(s)	58	3	1	4	2	4	6
Total Trips				**340**	**9**	**5**	**14**	**15**	**16**	**31**

The proposed development is expected to generate 340 daily trips, with 14 trips occurring in the AM peak hour and 31 trips occurring in the PM peak hour.

Under the existing zoning, six single-family dwelling units could be developed. A trip generation comparison of a potential land use under the existing zoning and the proposed development under the new zoning is summarized in **Table 5**.

Table 5. Trip Generation Comparison

Land Use	ITE Code	Quantity	Units	Daily Total	AM Peak			PM Peak		
					In	Out	Total	In	Out	Total
Single-Family Detached Housing	210	6	DUs	58	1	3	4	4	2	6

The calculation indicates that the proposed land use may increase daily trips by as much as 282 trips. During the AM peak period, the proposed development may increase trip generation by 10 trips, during the PM peak period, the trip generation may increase by 25 trips when compared to an existing potential use for the site.

5.1.2 TRIP DISTRIBUTION

Daily trips were distributed based on the Maricopa Association of Governments' (MAG) estimate of total households within a 11.8-mile radius of the site and distributed over the cardinal directions. This radius is based on the average employment trip length as reported from the 2009 National Household Travel Survey (NHTS).

Percent to and from:	2015	2040
North	10 %	13 %
East	7 %	7 %
South	33 %	29 %
West	50 %	51 %

The results of this distribution are used as a basis for determining the ultimate trip distribution for the site. In addition to the MAG projected residential distribution, the ultimate surrounding roadway system also is taken into consideration when trip distribution is determined; therefore, the distribution shown above was further refined by considering the future roadway network near the site. **Figure 4** illustrates the trip distribution for the study area.

5.1.3 TRAFFIC ASSIGNMENT

Trips generated by the proposed development were assigned to the roadway network on the basis of the trip distribution and the likely travel patterns to and from the site. **Figure 5** shows the results of the traffic assignment.

5.2 FUTURE TRAFFIC FORECASTING

The area in the vicinity of the site is generally developed and additional growth in the surrounding area that would significantly contribute to the street system traffic volumes is not expected.

5.3 TOTAL TRAFFIC

The results of the traffic assignment were added to the existing traffic volumes shown in **Figure 3** to produce total traffic volumes for the study area. These total traffic volumes are shown in **Figure 6**.

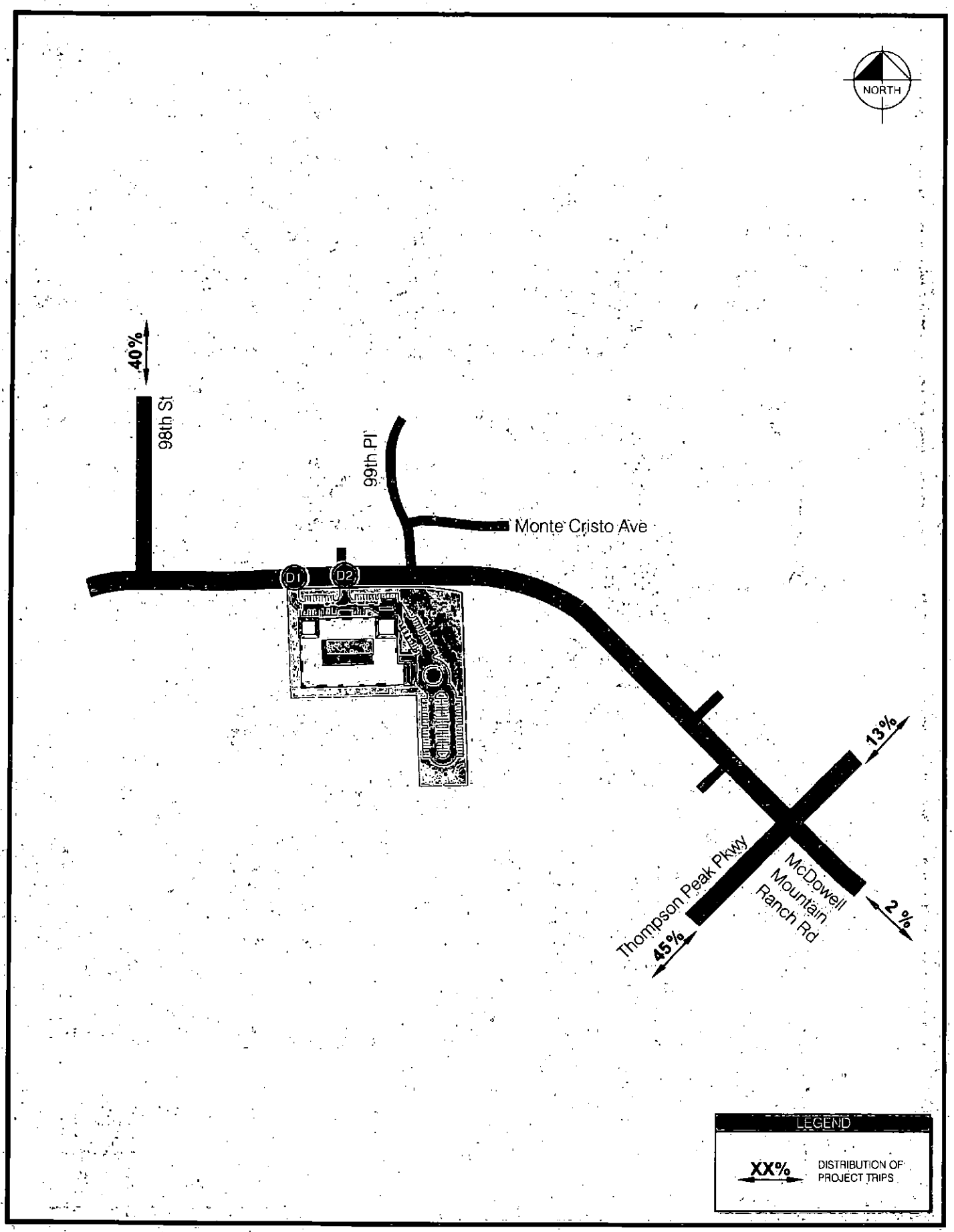

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Figure 4
Trip Distribution

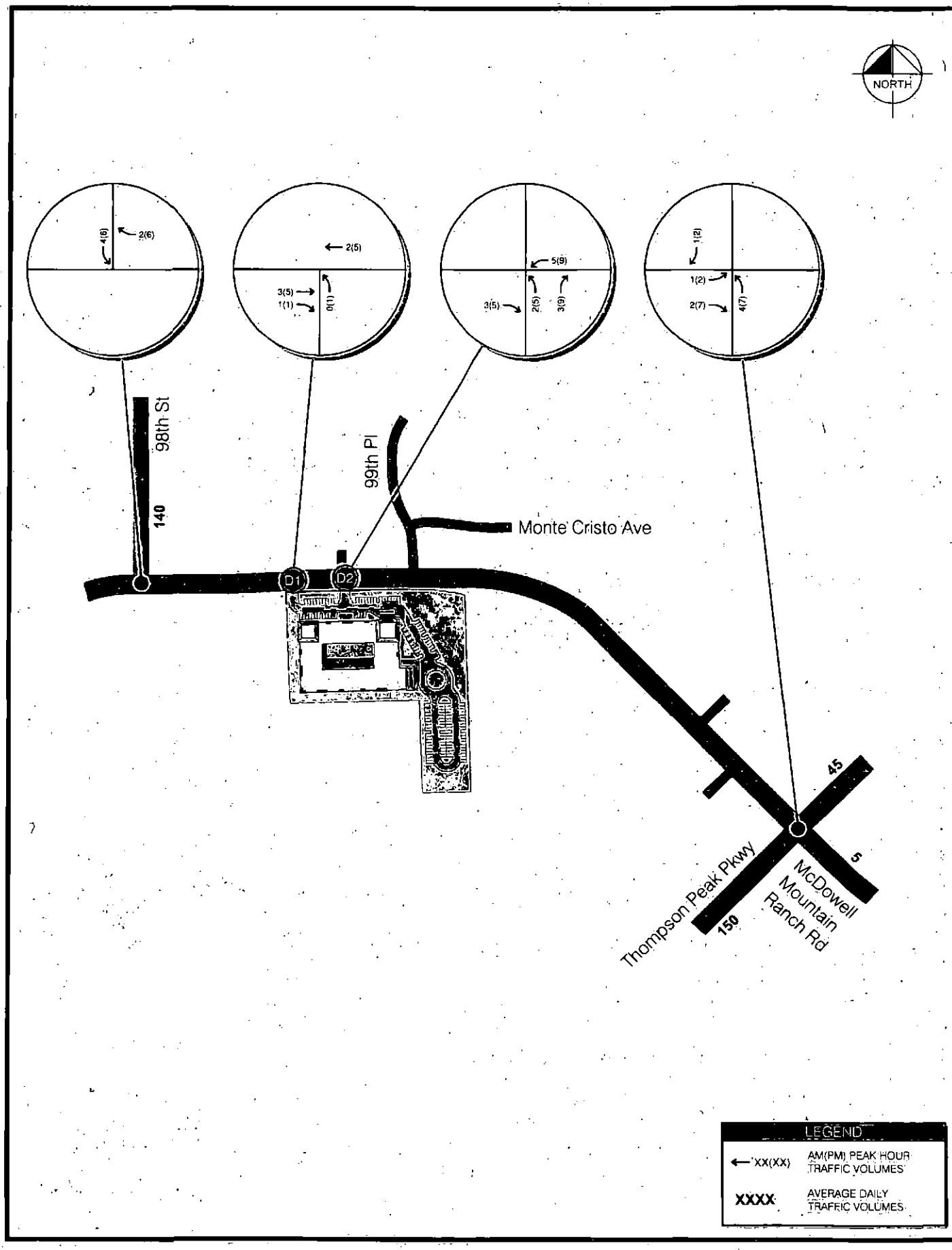

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Figure 5
Site Traffic Assignment

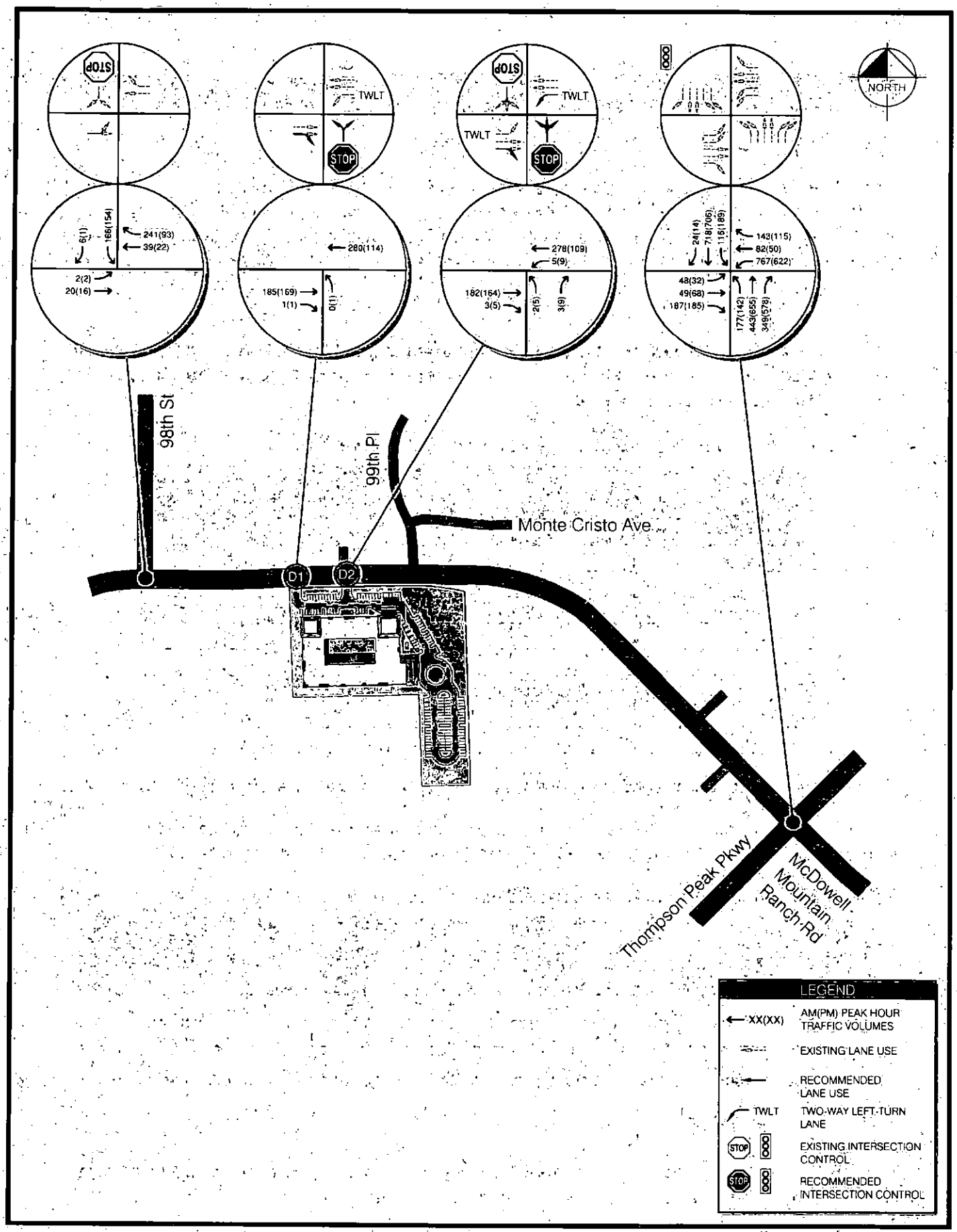

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Figure 6
2021 Total Traffic

6.0 TRAFFIC AND IMPROVEMENT ANALYSIS

6.1 LEVEL OF SERVICE ANALYSIS

The LOS for the study area intersections for 2021 were evaluated using the *Highway Capacity Manual 6th Edition* methodology for unsignalized intersections and *Synchro 10* methodology for the signalized intersection with signal timing information provided by the City of Scottsdale. LOS analysis worksheets and signal timing assumptions are included in the **Appendix**.

6.1.1 2021 TOTAL TRAFFIC LEVEL OF SERVICE ANALYSIS

The unsignalized intersection in the study area was evaluated on the basis of the 2021 total traffic and the recommended geometry shown in **Figure 6**. The results of the analysis for the unsignalized intersections and site driveways are shown in **Table 6**.

Table 6. 2021 Total Traffic Level of Service: Unsignalized Intersections

Intersection	NB			SB			EB			WB		
	L	T	R	L	T	R	L	T	R	L	T	R
98th Street and McDowell Mountain Ranch Road												
AM Peak	-			B			A			-	-	-
PM Peak	-			B			A			-	-	-
Driveway D1 and McDowell Mountain Ranch Road												
AM Peak	-			-			-			-	-	-
PM Peak	B			-			-			-	-	-
Driveway D2 and McDowell Mountain Ranch Road												
AM Peak	A			-	-	-	-			A	-	
PM Peak	A			-	-	-	-			A	-	

The unsignalized intersections and site driveways are expected to operate at a satisfactory LOS in 2021.

The signalized intersection in the study area was evaluated on the basis of the 2021 total traffic and the recommended geometry shown in **Figure 6**. The results of this analysis are shown in **Table 7**.

Table 7. 2021 Total Traffic Level of Service: Signalized Intersection

Intersection	NB			SB			EB			WB			Intersection
	L	T	R	L	T	R	L	T	R	L	T	R	LOS
Thompson Peak Parkway and McDowell Mountain Ranch Road													
AM Peak	D	C	A	D	D	A	D	D	B	D	C	A	C
PM Peak	D	C	A	E	D	A	D	E	B	D	C	A	C

The signalized intersections' operation conclusions are the same as the existing traffic condition.

6.2 LEFT-TURN STORAGE ANALYSIS

The signalized and unsignalized intersections in the study area were analyzed to determine the left-turn storage needed to accommodate the expected traffic volumes in the year 2021.

The left-turn storage lengths were determined for the left-turn movements at the study area intersections. The calculations associated with these conclusions are included in the **Appendix**. The recommended storage lengths are based on total traffic volumes shown in **Figure 6**.

Table 8. Left Turn Storage

Intersection and Approach	*Existing*	Recommended
Thompson Peak Parkway and McDowell Mountain Ranch Road		
Northbound Approach	225 feet	225 feet*
Southbound Approach	260 feet	260 feet*
Eastbound Approach	300 feet	300 feet*
Westbound Approach	250 feet	250 feet**
Driveway D1 and McDowell Mountain Ranch Road		
Westbound Approach	-	TWLT
Driveway D2 and McDowell Mountain Ranch Road		
Westbound Approach	-	TWLT

*Calculated value less than existing.

**Storage is not impacted by the development. No mitigation recommended.

TWLT = Two-way left-turn.

It is recommended that the westbound approach to the intersection of Driveway D2 and McDowell Mountain Ranch Road be restriped to provide a two-way left-turn lane which also allows access to the existing private street on the north side of McDowell Mountain Ranch Road.

6.3 RIGHT-TURN LANES

Right-turn lanes are often recommended on roadways where right-turning vehicles create delays or safety problems for other traffic movements. The need for a right-turn lane depends on the speed of traffic on the road, the volume of traffic turning right, and the through traffic volume in the same lane as the right-turning traffic.

6.3.1 INTERSECTIONS

Right turn lanes are in place on all approaches to the intersections of McDowell Mountain Ranch Road and Thompson Peak Parkway. A dedicated westbound right turn drop lane is in place at the intersection of McDowell Mountain Ranch Road and 98th Street.

Site traffic will not significantly impact the right turn storage at the intersection of Thompson Peak Parkway and McDowell Mountain Ranch Road, therefore, no modifications are recommended at the intersection.

6.3.2 DRIVEWAY

The City of Scottsdale recommends a right-turn deceleration lane at site driveways when the following criteria is met:

- At least 5,000 vehicles per day are expected to use the street;

- The 85th percentile traffic speed on the street is at least 35 miles per hour;
- At least 30 vehicles will make right turns into the driveway during a one hour period.

Review of total traffic under the buildout condition in previously referenced **Figure 6** reveals that the site driveways do not meet the criteria for the installation of a right-turn deceleration lane for the eastbound right turn lanes at the intersections of McDowell Mountain Ranch Road with Driveway D1 and D2.

6.4 DRIVEWAY CRITERIA

The site driveways satisfy the City of Scottsdale minimum driveway spacing requirement of 150 feet for driveways along major collector roadways.

6.5 SITE CIRCULATION

In order to provide smooth ingress and egress to the proposed development, all site driveways should be constructed with appropriate throat lengths. Provision of sufficient throat lengths at all site driveways will prevent entering vehicles from obstructing traffic flow on the adjacent public street system and provide adequate on-site storage for exiting vehicles. Based on queuing analysis for unsignalized intersections, the proposed site driveways provide sufficient on-site storage lengths to accommodate the anticipated future queue length at the proposed site access driveways.

6.6 SIGHT TRIANGLES

It is recommended that sight triangles be provided at all site access points to give drivers exiting the site a clear view of oncoming traffic. The landscaping within sight triangles must not obstruct drivers' views of the adjacent travel lanes. Sight distance should be provided at all street intersections and where driveways intersect with streets per Section 5-3.123 Part D of City of Scottsdale Design Standards & Policies Manual.

7.0 CONCLUSIONS AND RECOMMENDATIONS

The proposed development is expected to generate 340 daily trips, with 14 trips occurring in the AM peak hour and 31 trips occurring in the PM peak hour. To ensure that the estimate of the traffic impacts is the maximum that can be expected, it is assumed that the site will be 100 percent occupied upon buildout in 2021.

The signalized intersection of Thompson Peak Parkway and McDowell Mountain Ranch Road is expected to operate at an acceptable level of service in 2021, with the exception of the southbound left-turn lane and the eastbound thru lane in the PM peak period.

The unsignalized intersection of 98th Street and McDowell Mountain Ranch Road and the site driveways are expected to operate at an acceptable level of service in 2021.

It is recommended that a continuous two-way left-turn lane be striped to provide access for the left turning movements into the site driveways and to maintain access to the existing private streets on the north side of McDowell Mountain Ranch Road.

It is recommended that sight triangles be provided at all site access points to give drivers exiting the site a clear view of oncoming traffic. The landscaping within sight triangles must not obstruct drivers' views of the adjacent travel lanes. Sight distance should be provided at all street intersections and where driveways intersect with streets per Section 5-3.123 Part D of City of Scottsdale Design Standards & Policies Manual.

APPENDIX

- Traffic Counts
- Signal Timing Information
- Trip Generation Calculations
- Existing AM Traffic Capacity Analysis
- Existing PM Traffic Capacity Analysis
- 2021 Total AM Traffic Capacity Analysis
- 2021 Total PM Traffic Capacity Analysis
- Left Turn Storage Calculations
- City of Scottsdale Standards

Kimley»Horn

May 9, 2019

Dr. Stephen Weiss
SCW Holdings, LLP
10405 East McDowell Mountain Ranch Road
Scottsdale, Arizona 85255

Re: Parking Study for Senior Living Facility, Scottsdale, Arizona

Dear Mr. Weiss:

This letter outlines our findings regarding a parking study of the 5.3-acre± site located near the southwest corner of the intersection of 99th Place and McDowell Ranch Road in Scottsdale, Arizona. The development plan for the site consists of a 161,244 square foot senior care facility with an estimated 22 assisted living beds and 139 dwelling units for congregate care. Access to the site is proposed to be provided by two proposed full access driveways approximately 470 feet and 620 feet east of 98th Street on the south side of McDowell Mountain Ranch Road. The purpose of this study is to determine the appropriate parking ratio and required number parking spaces for the senior care facility. This parking study will compare the City of Scottsdale Zoning and Development Codes with other sources such as the *Institute of Transportation Engineers (ITE) Parking Generation 5th Edition* guidelines. A copy of the proposed site plan is attached.

The City of Scottsdale identifies various land uses and the corresponding required parking ratio within the Zoning and Development Code section 9.103. The Zoning and Development Code table 9.103.A identifies parking requirements for a residential health care facility land use classification. The parking generation characteristics of the proposed land use assumptions are summarized in **Table 1**.

Table 1 – City of Scottsdale Residential Health Care Facility Requirements

Land Use	Required Parking Ratio	Quantity	Calculated Parking
Residential Health Care Facility	Specialized care facilities—0.7 parking space for each bed.	22 Beds	16 spaces
	Minimal care facilities—1.25 parking spaces for each dwelling unit.	139 DU's	174 spaces

Under the proposed development plan land uses assumptions, the City of Scottsdale parking requirements for the site would be expected to provide 190 parking spaces.

The *Institute of Transportation Engineers (ITE) Parking Generation 5th Edition* parking generation ratios for an assisted living and congregate care facility are shown in **Table 2**. These values reflect parking rates based on observations of similar uses.

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5/13/2019

Table 2 – ITE Parking Generation Requirements

Land Use	Required Parking Rate	Quantity	Calculated Parking
Assisted Living	0.39 vehicles per bed	22 beds	9
Congregate Care Facility	0.30 vehicles per dwelling units	139 dwelling units	42

Under the ITE parking generation the maximum required number of parking spaces is 51 spaces.

The site plan for the proposed development provides 163 parking spaces for the senior living facility. The ITE parking generation suggests 51 parking spaces would be required in the peak periods. Based on the peak parking demand, it is expected the current proposed site parking exceeds the number of spaces calculated with the ITE parking generation rates. The parking supply of 163 parking spaces is 14.2 percent lower than the standard code requirement of 190 parking spaces, which is less than the 20 percent maximum use waiver typically allowed by code.

If you have any further questions, please feel free to contact me at (602) 944-5500.

Very truly yours,

KIMLEY-HORN AND ASSOCIATES, INC.

Charles R. Wright, P.E.

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Michael P. Leary, LTD
10278 E. Hillery Drive
Scottsdale, AZ 85255

(480) 991-1111
michaelpleary@cox.net

Date: July 1, 2019

To: Doris McClay, Scottsdale Senior Planner

From: Mike Leary

Subject: **Senior Living at McDowell Mountain Parking Analysis – Addendum**

The previously submitted parking demand study substantiates that residential health care (congregate care) generates far fewer spaces than currently required by ordinance. Previous parking studies for other facilities in the City have reached the same conclusion and have been the basis for routine approvals of 20% reductions which are allowed at a staff level. However, those same studies have indicated that a significantly greater reduction is warranted and more consistent with the City's original parking ratios for residential health care facilities (RHCF).

As part of an overall update to parking ratios a decade ago, the RHCF parking ratios were inexplicitly **doubled** without any documentation or involvement of RHCF users. The doubling rendered every RHCF in the City "nonconforming" in parking. When the City was made aware of problem, the parking ratios were reduced but not to the original ratios. Below is a breakdown of ratios before and after the amendment.

PARKING SPACES REQ'D	MINIMAL CARE	SPECIALIZED CARE
ORIGINAL	0.70/UNIT	0.5/BED
AMENDMENT	**1.50**/UNIT	**1.0**/BED
CURRENT	1.25/UNIT	0.7/BED

A parking demand study was completed for the Scottsdale Senior Living facility at 8225 E. Indian Bend Road. At 159 units Scottsdale's current parking requirement is 199 spaces (1.25 spaces/unit) yet the parking study calculated 68 spaces (0.43 spaces/unit) per ITE parking generation rates and other Valley cities averaging 83 spaces (0.48 spaces/unit).

Another study (see attached) was completed for the Legacy Scottsdale project at 8890 East Legacy Boulevard. At 175 units the total number of parking spaces using the current ratio was 219 spaces (1.25 spaces/unit) yet the parking study calculated an actual demand between 71 to 115 spaces (0.41 to 0.65 spaces/unit).

These studies suggest that the City's original ratios of 0.7 spaces/unit for minimal care and 0.5 spaces/bed for specialized care are still higher than projected demand. The subject project at 161 units and per the City's current zoning ordinance (1.25 spaces/unit) would require 202 spaces. The zoning ordinance requirement under the original standard of 0.7 spaces/unit would require 121 spaces. The subject project proposes 129 spaces at a ratio of 0.8 spaces/unit.

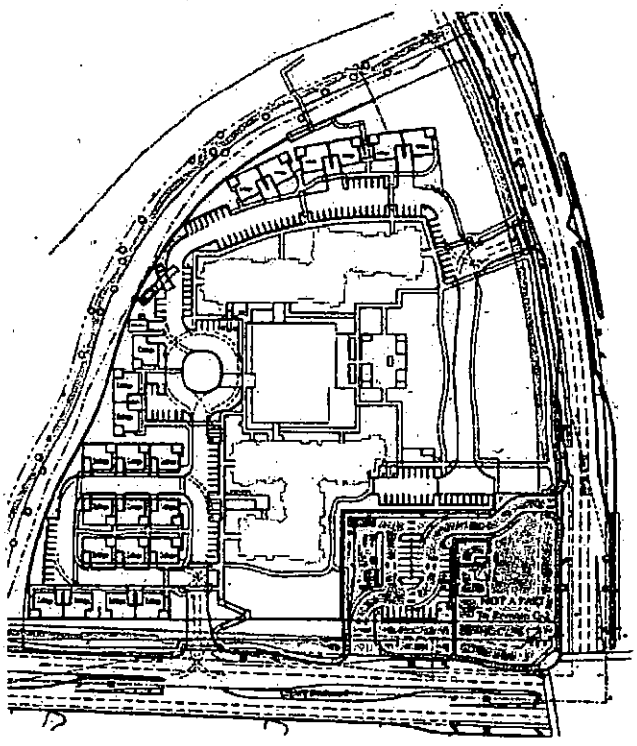
Established RHCF facilities in northern Scottsdale were surveyed on a Sunday with the results showing significant parking underutilization.

project	address	case #	spaces provided	spaces occupied	% occupied
Sunrise Senior Living	7370 E. Gold Dust	84-DR-2004	41	30	0.75
Amber Creek Inn	9160 E. Desert Cove	20-DR-2006	41	14	0.34
Life Care Center of Scottsdale	9494. E. Becker Ln	101-SD-1985	84	36	0.43
Belmont*	13859 N. FLWB	59-DR-2009	68 + 25	42	0.45
ARTE Memory Care	9450 E. Mountain View	11-DR-2011	72	31	0.43
* originally parked at the wrong 0.5 ratio instead of 0.75					

In prior discussions with staff regarding a text amendment, significantly lower parking requirements have been supported. In the absence of a text amendment the only other relief mechanism is through the City Council. The proposed Senior Living at McDowell Mountain Ranch is requesting the parking reduction to further meet many of the stated goals of the General Plan by encouraging environmentally sensitive and sustainable development that respects the desert setting by reducing solar heat gain, minimizing impervious surfaces and runoff, utilizing best practices and pursuing smart development.

attachment

Wolff Legacy Scottsdale
Parking Master Plan



Prepared for:

Mark Kaminski
The Wolff Company
6710 E. Camelback Road, Suite 100
Scottsdale, AZ 85251

Prepared by:

J2 Engineering and Environmental Design
4649 E. Cotton Gin Loop, Suite B2
Phoenix, AZ 84040

EXPIRES 6-30-19

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1. Executive Summary

J2 Engineering and Environmental Design (J2) has prepared a Parking Master Plan for the proposed Wolff Legacy Scottsdale development, consisting of 153 residential units and 22 cottage style residential units. Of the 153 apartments units, there will be 26 studio units, 82 one-bedroom units, and 45 two-bedroom units. Additionally, there will be a 15,000 square foot clubhouse located in the center of the proposed development. The proposed development will be located on the northwest corner of Pima Road and Legacy Boulevard, in Scottsdale, Arizona. See **Appendix A** for proposed site plan.

Through the approval of a parking master plan, Wolff Legacy Scottsdale is requesting approval to provide 175 parking stalls on site for the proposed development. Of the 175 parking stalls provided, 44 parking stalls will be provided for the 22 cottage style residential units, the remaining 131 parking stalls will be located on the surface throughout the development. To determine the parking demand for the proposed development, four (4) different parking demand calculation approaches were analyzed.

Approach 1 – Scottsdale Code
The City of Scottsdale parking requirement was calculated Table 9.103.A entitles Schedule of Parking Requirements within the City of Scottsdale Code of Ordinances, Article IX – Parking and Loading Requirements provides general parking requirements. See **Appendix B** for the print out of Article IX.

The proposed Wolff Legacy Scottsdale falls under the category of Residential Health Care Facilities – Minimal Care Facilities. There is not a specific parking category for independent senior living. According to Table 9.103.A of the City of Scottsdale Code of Ordinances requires the following parking stall accommodations:

- Residential Health Care Facilities:
  Minimal Care Facilities – 1.25 parking spaces for each dwelling unit

Independent senior living facilities are designed for those over a specific age and often attract part-time residents, retired residents, and widowed residents. The proposed Wolff Legacy Scottsdale development will be an age-restricted community requiring residences to be fifty-five and older. There will be an on-site central dining hall, and there is anticipated to be regular shuttle transportation services provided to residents.

Using the City of Scottsdale Code of Ordinances Residential Health Care – Minimal Care Facilities category to calculate the number of parking stalls required for the proposed Wolff Legacy Scottsdale development results in 219 parking stalls.

Approach 2 – ITE Parking Generation
The second approach utilized the parking demand rates provided in the national publication by ITE entitled *Parking Generation, 4th Edition*:

- Method 1:
  - Land Use 252 – Senior Adult Housing – Attached
- Method 2:
  - Land Use 253 – Congregate Care Facility

The proposed Wolff Legacy Scottsdale development falls between Land Use 252- Senior Adult Housing Attached and Land Use 253 – Congregate Care Facility, therefore, based on the ITE Parking Generation calculations, the parking demand is anticipated to fall between 72 and 116 parking spaces, which results in a surplus between 59 and 103 parking stalls.

Approach 3 – Other Cities and Towns
The third approach looked at the parking requirement for other nearby cities and towns, including the Town of Gilbert, City of Glendale, and City of Surprise. **The parking requirements for the Town of Gilbert, City of Glendale, and City of Surprise resulted in a parking surplus ranging between 87 and 116 parking stalls.**

Approach 4 – The Wolff Company Parking Experience
The Wolff Company has built a number of similar facilities in other states. Typically the parking provided ranges between 0.85 to 1.0 parking spaces per unit. The Wolff Company has found this ratio provides adequate parking and meets and exceeds the parking needs. **For this specific development, with 175 units, this would result in 149 to 175 parking spaces, and a potential surplus of 26 parking stalls.**

Conclusion:
Therefore, taking into consideration the parking calculations using the ITE Parking Generation, other cities and towns parking ordinances, as well as the parking data from similar sites built by The Wolff Company, the proposed 175 parking stalls should sufficiently accommodate the parking demand for the Wolff Legacy Scottsdale development.

2. Introduction

J2 Engineering and Environmental Design (J2) was retained by The Wolff Company to complete a Parking Master Plan for the proposed Wolff Legacy Scottsdale (8890 East Legacy Boulevard, Scottsdale, AZ, 85255) development, located on the northwest corner of Pima Road and Legacy Boulevard, in Scottsdale, Arizona. The Wolff Legacy Scottsdale will be a senior residential development. This center will be configured to allow coordination with resident's wellness/medical providers. Services provided by the Wellness Center will include, but not be limited to concierge medicine home health care, outcall physicians (physicals and annual checkups), outcall nurses (flu shots and vaccinations), podiatry, chiropractor, massage and physical therapy, speech and occupational therapy, hearing aid consultant, nutritionist, and mental health counselor. The proposed development is bound by Pima Road to the east, Legacy Boulevard to the south; 88th Street to the west, and a commercial development to the north. See **Figure 1** for a vicinity map.

The proposed development is anticipated to include 153 apartment units, and 22 cottages, for a total of 175 units. Of the 153 apartments units, there will be 26 studio units, 82 one-bedroom units, and 45 two-bedroom units. See **Table 1** below. Additionally, a 15,000 square foot clubhouse will be located in the center of the proposed development. The clubhouse will provide several amenities including, a multi-purpose room, theater, art space, kitchen, fitness center, casual dining, and formal dining. It is anticipated that the clubhouse will be primarily for residents with occasional use by guests of residents. See **Figure 2** and **Appendix A** for a site plan.

Table 1 - Wolff Legacy Scottsdale Apartment Units

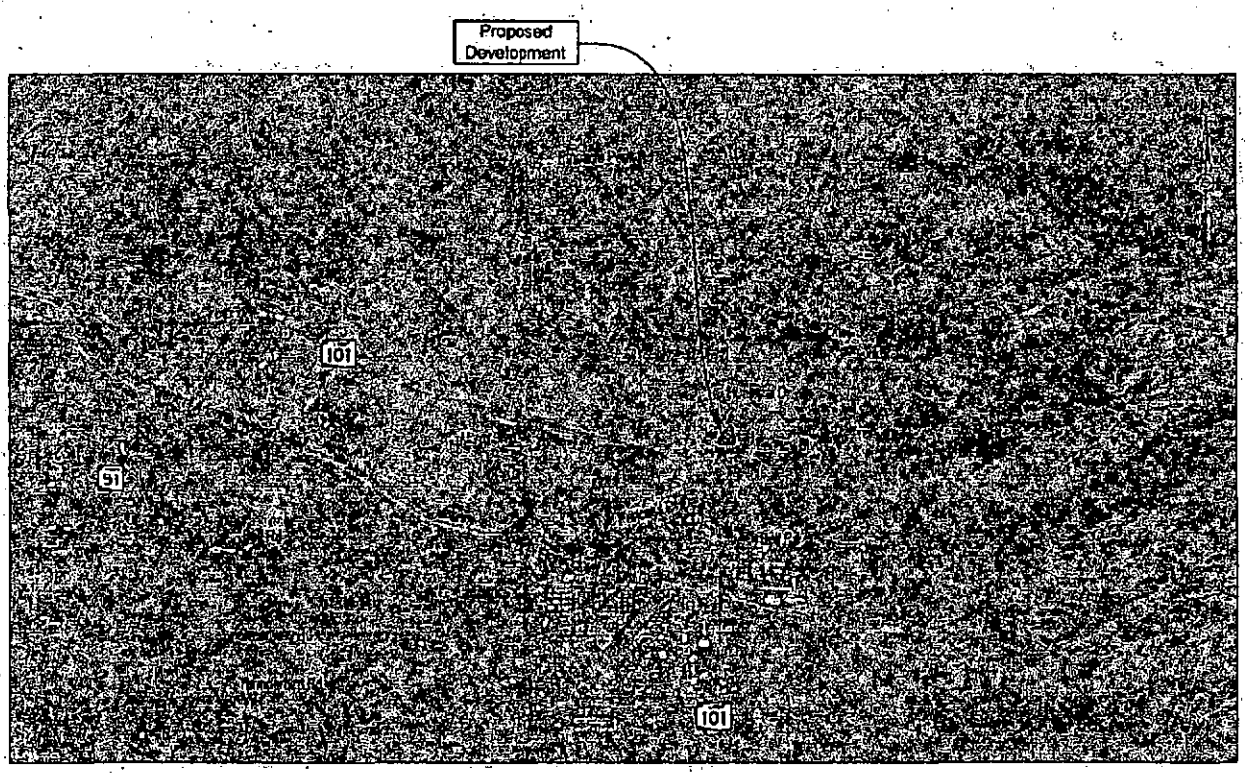
Floor Plan Unit	Quantity	Number of Beds	Area (sq. ft.)
GS	2	1	364
S1	24	1	480
A1	12	1	610
A2	21	1	684
A3	19	1	733
A5	30	1	649
B1	18	2	821
B2	6	2	912
B3	6	2	945
B6	15	2	1134

Scope of Study

This Parking Master Plan calculates the number of parking spaces required for the proposed development based on the City of Scottsdale Code, ITE Parking Generation, as well as other nearby City and Town requirements. Ultimately, the objective of this Parking Master Plan is to analyze the appropriate number of parking spaces required to provide sufficient parking for the proposed Wolff Legacy Scottsdale development.

Surrounding Area

Located to the west, across 88th Street, is the Central Arizona Project water campus and undeveloped land. To the south, across Legacy Boulevard, is undeveloped land. To the east, across Pima Road, are the Cliffs at Ironwood Village residential community. To the immediate north of the proposed development is a commercial development consisting of a series of businesses including Pulse Fitness, Christ's Church of the Valley, Pure Flix Entertainment, and Matson Money.



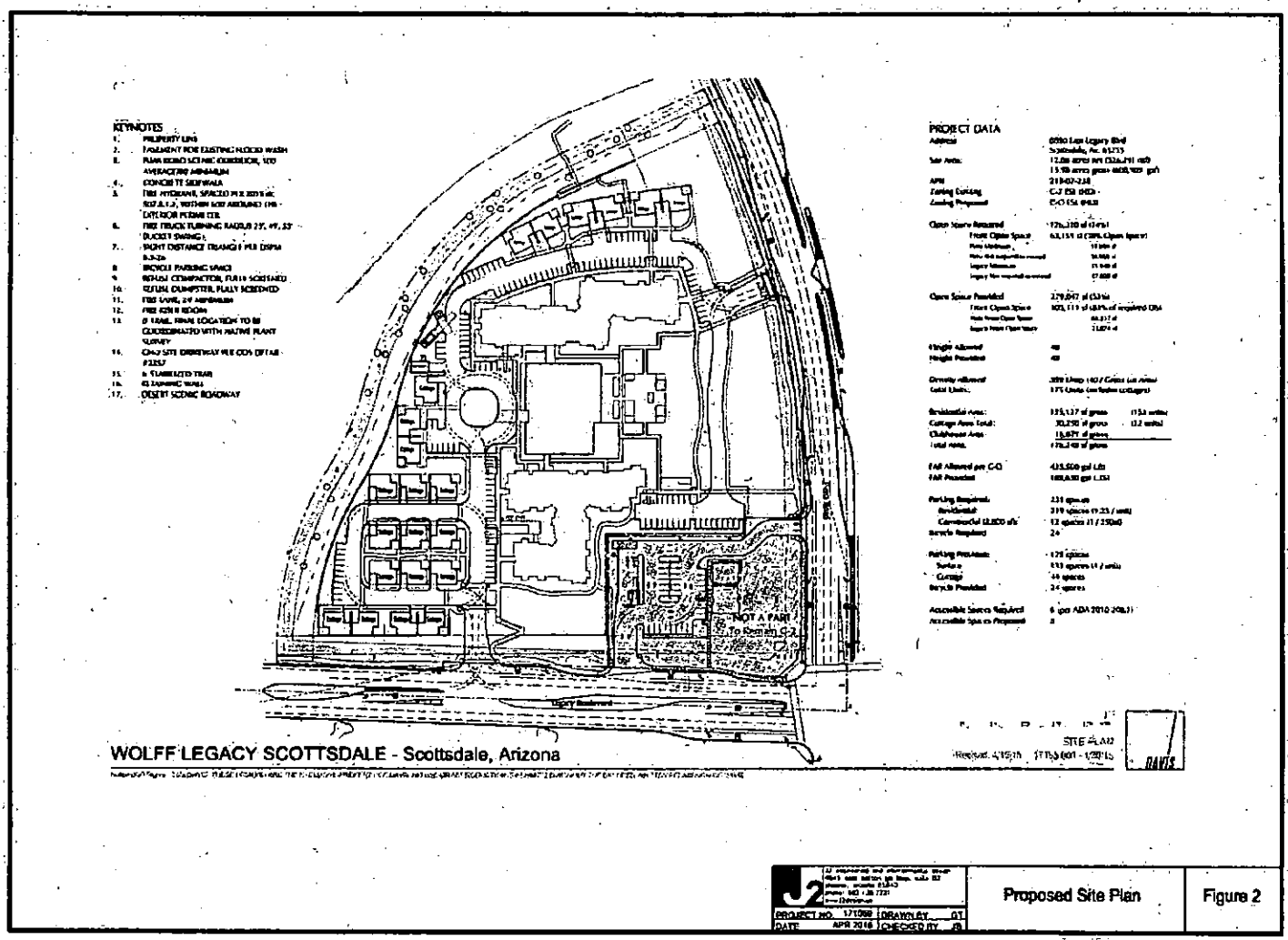
PROJECT NO. 171038 DRAWN BY GT DATE APR 2018 CHECKED BY JE	Vicinity Map	Figure 1

3. Proposed Parking

The proposed Wolff Legacy Scottsdale development will consist of 153 apartment units and 22 cottage style residential units, for a total of 175 units. Of the 153 apartments units, there will be 26 studio units, 82 one-bedroom units, and 45 two-bedroom units. Additionally, there will be a 15,000 square foot clubhouse located in the center of the proposed development. It is anticipated that the clubhouse will be primarily for residents with occasional use by guests of residents. The proposed site plan includes two (2) proposed access points for the proposed Wolff Legacy Scottsdale development. There will be a full access driveway, allowing all movements into and out of the proposed development, on Pima Road approximately 675 feet north of Legacy Boulevard. A second full access driveway, allowing all movements into and out of the proposed development, will be located along Legacy Boulevard approximately 600 feet west of Pima Road.

A total of 175 parking stalls will be provided. The 22 cottage style residential units will include a one car attached garage with an apron located in front of the garage allowing for an additional parking space. Therefore, the cottages provide a total of 44 parking spots. The remaining 131 parking stalls will be located throughout the proposed development.

See **Figure 2** for the proposed site plan.



WOLFF LEGACY SCOTTSDALE - Scottsdale, Arizona

J2		Proposed Site Plan	Figure 2
PROJECT NO. 171098	DRAWN BY GT		
DATE APR 2018	CHECKED BY JB		

4. City of Scottsdale Required Parking

The proposed Wolff Legacy Scottsdale development includes 153 apartment units and 22 cottage style residential units with a 15,000 square foot clubhouse.

Table 9.103.A entitled Schedule of Parking Requirements within the City of Scottsdale Code of Ordinances, Volume II (see **Appendix B** for the print out of Article IX) provides the general parking requirements.

The proposed Wolff Legacy Scottsdale falls under the category of Residential Health Care Facilities – Minimal Care Facilities. There is not a specific parking category for independent senior living. According to Table 9.103.A of the City of Scottsdale Code of Ordinances requires the following parking accommodations:

- Residential Health Care Facilities:
  Minimal Care Facilities – 1.25 parking spaces for each dwelling unit

Applying this formula to the proposed Wolff Legacy Scottsdale Development results in the following parking requirement, see **Table 2**:

Table 2 - Scottsdale Parking Requirement

	Rate		Quantity	Unit	Parking Stalls (175 proposed)
Minimal Care Facility	1.25	Per Dwelling Unit	175	Dwelling Units	219

Independent senior living facilities are designed for those over a specific age and often attract part-time residents, retired residents, and widowed residents. The proposed Wolff Legacy Scottsdale development will be an age-restricted community requiring residences to be fifty-five and older. There will be an on-site central dining hall serving three meals a day, along with a bistro/pub area. Additionally, there will be regular shuttle transportation services provided to residents. Therefore, the above parking calculation as shown in **Table 2** likely exceeds the actual parking demand.

Conclusion:

Using the City of Scottsdale Code of Ordinances Residential Health Care – Minimal Care Facilities category to calculate the number of parking stalls required for the proposed Wolff Legacy Scottsdale development results in 219 parking stalls. However, this parking likely exceeds the actual parking demand.

5. ITE Parking Generation

The Institute of Transportation Engineers (ITE) publication titled *Parking Generation, 4th Edition* is utilized for estimating parking demand based on research and experiences of transportation engineering and planning professionals.

The proposed Wolff Legacy Scottsdale falls between two categories, Land Use (LU) 252 – Senior Adult Housing – Attached, and Land Use 253 – Congregate Care Facility. The proposed Wolff Legacy Scottsdale development will be providing centralized dining and transportation, which is similar to Land Use 253.

METHOD 1

Method 1 calculates the parking demand for the proposed development using Land Use 252 – Senior Adult Housing – Attached.

Land Use 252 – Senior Adult Housing - Attached

Senior adult housing consists of attached independent living developments, including retirement communities, age restricted housing and active adult communities. These developments may include limited social or recreational services. However, they generally lack centralized dining and on-site medical facilities. Residents in these communities live independently, are typically active (requiring little to no medical supervision) and may or may not be retired.

The average peak period parking demand ratio is 0.59 vehicles per dwelling unit, with an 85th percentile demand ratio of 0.66 vehicles per dwelling unit.

Table 3 - ITE Parking Demand (Senior Adult Housing – Attached)

	Rate			Quantity	Unit	Parking Stalls (175 proposed)
Senior Adult Housing - Attached	Average	0.59	Per Dwelling Unit	175	Dwelling Units	104
	85th Percentile	0.66	Per Dwelling Unit	175	Dwelling Units	116

METHOD 2

Method 2 calculates the parking demand for the proposed development using Land Use 253 – Congregate Care Facility.

Land Use 253 – Congregate Care Facility

Congregate care facilities are independent living developments that provide centralized amenities such as dining, housekeeping, transportation and organized social/recreational activities. Limited medical services (such as nursing and dental) may or may not be provided. The resident may contract additional medical services or personal assistance.

The data is limited on Congregate Care Facilities. Two suburban study sites provided a parking supply ratio of 0.5 spaces per dwelling unit, one site had a peak period parking demand ratio of 0.41 vehicles per dwelling unit, and the other site had a peak period parking demand ratio of 0.48 vehicles per dwelling unit.

Table 4 - ITE Parking Demand (Congregate Care Facility)

		Rate		Quantity	Unit	Parking Stalls (175 proposed)
Congregate Care Facility	Site 1	0.41	Per Dwelling Unit	175	Dwelling Units	72
	Site 2	0.48	Per Dwelling Unit	175	Dwelling Units	84

Conclusion:

Method 1

Calculated using Land Use 252 – Senior Adult Housing, the average peak period requires 104 parking stalls, and for the 85th percentile, a total of 116 parking stalls are required. This results in a parking stall surplus of 59 to 71 parking stalls.

Method 2

Calculated using Land Use 253 – Congregate Care Facility, for Site 1 the peak period requires 72 parking stalls, and for Site 2 the peak period requires 84 parking stalls. This results in a parking stall surplus of 91 to 103 parking stalls.

As previously discussed the proposed Wolff Legacy Scottsdale falls between the following categories Land Use 252- Senior Adult Housing Attached and Land Use 253 – Congregate Care Facility. Based on the above calculations, the parking demand is anticipated to fall between 72 and 116 parking spaces. This results in a parking surplus of 59 to 103 parking stalls.

6. Other Cities and Towns Required Parking

The parking requirements for other nearby cities and towns were researched for comparison. See **Appendix C** for additional details. The following tables show the parking requirements based on the respective City or Town code.

Table 5 - Town of Gilbert Parking Requirement

	Rate		Quantity	Unit	Parking Stalls (175 proposed)
Congregate Living Facility	0.5	Per Dwelling Unit	175	Dwelling Units	88
				Total	88

Table 6 - City of Glendale Parking Requirement

	Rate		Quantity	Unit	Parking Stalls (175 proposed)
Retirement/Senor Housing/Convalescent/ Nursing/Congregate Care Home	0.4	Per Dwelling Unit	175	Dwelling Units	70
				Total	70

Table 7 - City of Surprise Parking Requirement

	Rate		Quantity	Unit	Parking Stalls (175 proposed)
Retirement Housing Services/ Congregate Living Services	1	Per 3 Dwelling Units	175	Dwelling Units	59
				Total	59

Conclusion:

Of the three (3) nearby cities and towns that were researched for comparison, the parking requirement falls between 59 and 88 parking spaces. This results in a parking surplus of 87 to 116 parking stalls.

7. Wolff Legacy Scottsdale Proposed Location and Operation

The proposed site is located within walking distance to DC Ranch Crossing, a large retail plaza located on the southeast corner of Pima Road and Legacy Boulevard. DC Ranch Crossing includes several retail shops, restaurants, salons, and fitness centers. There are continuous sidewalks along the east side of Scottsdale Road. With the build out of the proposed Wolff Legacy Scottsdale, sidewalks will be provided along Pima Road and Legacy Boulevard adjacent to the development. Bike lanes are currently provided along both sides of Pima Road and Legacy Boulevard.

Additionally, located approximately two (2) miles to the southeast is Gateway Trailhead providing access to the McDowell Sonoran Preserve. Gateway Trailhead provides its hikers with three (3) unique trails for all levels of hikers.

On-Site Central Dining and Bistro
There will be a central dining hall with a full kitchen and bistro/pub providing hot meals to all residents for breakfast, lunch, and dinner. There will be wait staff, kitchen staff, and bartenders.

Transportation Services
Wolff Legacy Scottsdale will operate a 15 passenger van 7 days a week from 8:00 am to 5:00 pm with a programmed schedule to take residents to grocery stores, shops, malls, theaters, museums, restaurants and to medical appointments. In addition to the scheduled daily trips, the van will be available to residents to schedule other group activities.

Wolff Legacy Scottsdale will also set up accounts with a car service to assist with facilitating individual or smaller group trips.

Wolff Legacy Scottsdale Employees
Wolff Legacy Scottsdale anticipates approximately 26 to 32 employees would be on site during peak times, which is typically between 8:00 am and 6:00 pm. The following are the approximate number of employees that will be on-site during these hours:

Leasing Management	4 employees
Kitchen	11 employees, 18 during peak lunch and dinner times
Salon	4 employees
Wellness	2 employees
Fitness	2 employees
Maintenance	3 employees
TOTAL	26 employees, 32 during peak lunch and dinner times

Experience with Similar Facilities

The Wolff Company has built a number of similar facilities in other states. Typically, the parking provided ranges between 0.85 to 1.0 parking spaces per unit to support both residence and employee parking needs. The Wolff Company has found this ratio provides adequate parking and meets and exceeds the parking needs. For this specific development, with 175 units, this would result in 149 to 175 parking spaces. See **Appendix D** for parking data from other senior living facilities developed by the The Wolff Company.

Table 8 - The Wolff Company Parking Experience

	Rate		Quantity	Units	Parking Stalls (175 proposed)
Similar Facilities	0.85	Per Dwelling Unit	175	Dwelling Units	149
	1	Per Dwelling Unit	175	Dwelling Units	175

Transportation for Older Americans

According to the Federal Interagency Forum on Aging Related Statistic's publication *2016 Older Americans Key Indicators of Well-Being*, 19% of drivers 65 and older have given up driving altogether. See **Appendix E**. Additionally, 25% have trouble getting places, and 34% have reduced their travel because of health or physical problems. Based on these statistics, it is reasonable to assume that residents of this age restricted development would likely lean toward utilizing transportation services provided by Wolff Legacy Scottsdale with less reliance on a personal vehicle.

Conclusion:

The pedestrian and bicycle facilities adjacent and nearby, on-site central dining services, regular transportation provided to residents, prior experience with similar sites, and proposed operation, all contribute to reducing parking demand, encourages trip reduction, and improves traffic circulation, operation, and safety. However, all parking calculations did not include any reductions or credits. Therefore, providing a total of 175 parking spaces exceeds the parking needs for the proposed Wolff Legacy Scottsdale development.

8. Recommendations & Conclusions

The proposed Wolff Legacy Scottsdale will be located on the northwest corner of Pima Road and Legacy Boulevard in Scottsdale, Arizona. Wolff Legacy Scottsdale is an independent living residential development for seniors. The proposed development is anticipated to include 153 apartment units, and 22 cottages, for a total of 175 units. Of the 153 apartments units, there will be 26 studio units, 82 one-bedroom units, and 45 two-bedroom units. Additionally, a 15,000 square foot clubhouse will be located in the center of the proposed development. The clubhouse will provide several amenities including, a multi-purpose room, theater, art space, kitchen, fitness center, casual dining, and formal dining. It is anticipated that the clubhouse will be primarily for residents with occasional use by guests of residents.

A total of 175 parking stalls will be provided. The 22 cottage style residential units will include a one car attached garage with an apron located in front of the garage allowing for an additional parking space. Therefore, the cottages provide a total of 44 parking spots. The remaining 131 parking stalls will be located throughout the proposed development.

City of Scottsdale Code of Ordinances
The proposed Wolff Legacy Scottsdale development parking requirement based on the City of Scottsdale Code of Ordinances results in a total of 219 parking stalls.

ITE Parking Generation
Utilizing the ITE publication titled *Parking Generation, 4th Edition* the peak period parking demand was calculated for Land Use 252 - Senior Adult Housing – Attached, as well as Land Use 253 - Congregate Care Facility.

The proposed Wolff Legacy Scottsdale falls between Land Use 252- Senior Adult Housing Attached and Land Use 253 – Congregate Care Facility, therefore, based on the ITE Parking Generation calculations, the parking demand is anticipated to fall between 72 and 116 parking spaces, which results in a surplus between 59 and 103 parking stalls.

Other Cities and Towns Required Parking
The parking requirements for other nearby cities and towns were analyzed, including the Town of Gilbert, City of Glendale and City of Surprise which resulted in a 59 to 88 parking spaces required, which results in a surplus between 87 and 116 parking stalls.

The Wolff Company Parking Experience
Considering the on-site dining services, regular transportation provided to residents, prior experience with similar sites, and proposed operation, providing between 149 to 175 parking spaces exceeds the parking needs of the proposed Wolff Legacy Scottsdale development, with a potential surplus of 26 parking stalls.

A summary of the parking calculations are shown in **Table 9**.

Table 9 - Parking Calculations Summary

	Reference Table	Parking Requirement/Demand (175 Proposed)	Requirement/Demand vs. Proposed
Approach 1 - City of Scottsdale Code			
City of Scottsdale Code	1	219	44 Deficiency
Approach 2 - ITE Parking Generation			
Senior Adult Housing - Attached (Average)	2	104	71 Surplus
Senior Adult Housing - Attached (85th Percentile)	2	116	59 Surplus
Congregate Care Facility (Site 1)	3	72	103 Surplus
Congregate Care Facility (Site 2)	3	84	91 Surplus
Approach 3 - Other Cities and Towns			
Town of Gilbert	4	88	87 Surplus
City of Glendale	5	70	105 Surplus
City of Surprise	6	59	116 Surplus
Approach 4 - The Wolff Company Parking Experience			
Minimum Parking Experience Rate	7	149	26 Surplus
Maximum Parking Experience Rate	7	175	Sufficient

The proposed Wolff Legacy Scottsdale development will be an age-restricted community requiring residents to be fifty-five and older. There will be an on-site central dining hall with a full kitchen as well as daily transportation shuttle services provided to all residents. There are pedestrian and bicycle facilities adjacent and nearby, including existing and proposed sidewalks along Pima Road and Legacy Boulevard, along with bike lanes on both roadways.

The pedestrian and bicycle facilities adjacent and nearby, on-site central dining services, regular transportation provided to residents, prior experience with similar sites, and proposed operation, all contribute to reducing parking demand, encourages trip reduction, and improves traffic circulation, operation, and safety. However, all parking calculations did not include any reductions or credits.

Therefore, taking into consideration the parking calculations using the ITE Parking Generation, other cities and towns parking ordinances, as well as the parking data from similar sites built by The Wolff Company, the proposed 175 parking stalls should sufficiently accommodate the parking demand for the Wolff Legacy Scottsdale development.

PRELIMINARY DRAINAGE REPORT

Senior Living at McDowell Mountain Ranch

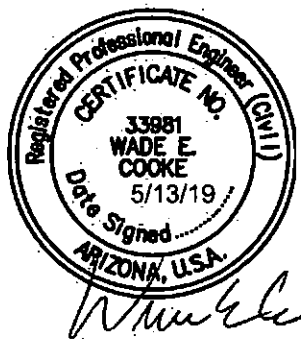
SCOTTSDALE, ARIZONA

Prepared for:

RYAN A+E, INC.
3900 E. Camelback Road Ste 100
Phoenix, Arizona 85018

Prepared by:

LANDCOR CONSULTING
2663 E. Hobart Street
Gilbert, Arizona 85296
(480) 223-8573



May 13, 2019
Job #1617

8-ZN-2019
5/13/2019

PRELIMINARY DRAINAGE REPORT
FOR
SENIOR LIVING AT MCDOWELL MOUNTAIN RANCH

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I. PROJECT DESCRIPTION

This Project is a proposed 161 unit senior care facility on a vacant 5 acre parcel located east of 98th Street on the south side of McDowell Mountain Ranch Road (see Figure 1). Site development consists of a single building with three floors with separate entrances and drop-off areas for independent/assisted and memory care. A large triangular area at the northeast corner of the property contains a remnant of the little-known old Rio Verde Canal (berm) which has been reclaimed by dense native vegetation and will be left untouched.

The property is a portion of the southwest quarter of Section 5, Township 3 North, Range 5 East of the Gila and Salt River Base and Meridian. The property is bound by McDowell Mountain Ranch Road to the north and undeveloped properties on the East, West and South sides.

The purpose of this report is to present a drainage design that is in compliance with City of Scottsdale's *Design Standards & Policies Manual* (DS&PM) and is compatible with the existing development.

II. FLOOD PLAIN DESIGNATION

The majority of this site is located within Zone "X" as shown on the FEMA Flood Insurance Rate Map 04013C1340L dated October 16, 2013 (see Figure 2 in Appendix A). Flood Zone "X" is defined as:

> "areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood."

The southwest corner of the site is slightly impacted by Zone "A". Zone "A" is Special Flood Hazard Area (SFHA) without a defined Base Flood Elevation (BFE). This SFHA includes inundation limits caused by the Central Arizona Project (CAP) canal and basin.

III. EXISTING CONDITIONS

The site and surrounding areas generally drain in a southwesterly direction towards the CAP basin. There is a significant upstream watershed that has a major impact on area drainage conditions as discussed below. This watershed has been analyzed in detail and is described most recently in a report titled *Southwest Corner Thompson Peak Parkway & McDowell Mountain Ranch Road Preliminary Drainage Report* by Erie and Associates dated May 8, 2019 (see excerpts in Appendix B).

As shown in Figure 3, storm water runoff from the upstream areas northeast of the Rio Verde Canal (RVC) pond along the north side of the existing

embankment from McDowell Mountain Ranch Road (MMRR) to Thompson Peak Parkway (TPP). Upstream flows are conveyed through 2-3'x'8 box culverts and since there is no outfall due to the construction of the TPP roadway, existing runoff ultimately ponds and reverses direction northwesterly to where the RVC intersects MMRR. From there, minor flows are conveyed northwesterly across MMRR via 2-24" RCP culverts. During a major storm event the culverts capacity is exceeded and storm water overtops onto MMRR, flows onto the subject property, and then continues south to the CAP basin.

The remainder of the site is generally protected from significant offsite flows by the RVC berm. All runoff exiting the site flows directly to the CAP Basin.

IV. PROPOSED DRAINAGE PLAN

General

Stormwater storage basins will be provided on-site as discussed below. Runoff will be conveyed to the proposed basins by a combination of surface drainage and underground storm drain facilities. Calculations and sizing for underground storm drain pipes and appurtenances will be provided with the final design.

Rio Verde Outfall Channel

The owners of the three affected privately-owned properties on the south side of MMRR from TPP to 98th Street are requesting approval of a Master Drainage concept that will provide the basis for site design and immediate development of the subject property (see Appendix C). This Master Drainage concept will also mitigate the negative drainage conditions along the RVC on adjoining properties as well as McDowell Mountain Ranch Road (MMRR). City staff has reviewed and accepted the proposal with stipulations (Appendix D).

Subject to final submittal

The proposed drainage concept includes the construction of an outfall channel south of the RVC as shown in Figure 4 and provides a direct connection for offsite flows to reach the CAP basin thereby eliminating most of the drainage/ponding impacts currently experienced by the adjoining properties. This proposed channel route would extend the existing riprap channel south of MMRR to an existing wash with adequate capacity located on the Arizona State Land Department property.

Stormwater Storage

? plan shows basins

This project will pursue a full waiver of stormwater storage requirements based on waiver criteria 1 which is based on adequate capacity of downstream facilities to convey additional runoff in accordance with City of Scottsdale's DS&PM. The project will be subject in lieu fees for the volume waived above the pre versus post requirement. Stormwater storage facilities will be constructed on-site to store runoff from rainfall events up to and including the first flush volume. Runoff in the adjacent half street will not be included in the volume provided on-site and therefore will also be subject to in lieu fees. Calculations for the on-site stormwater storage volumes required and provided are presented in Appendix E.

On-site contributing drainage areas are shown in Figure 5. The City of Scottsdale Stormwater Waiver is included in Appendix F.

Stormwater Storage will be provided in two separate surface basins located along the south boundaries of the site as shown in the *Preliminary Grading & Drainage Plan* (Figure 6). The detention basins are designed in accordance with City of Scottsdale's DS&PM.

The flood limits that are represented by FEMA Zone "A" are part of the CAP Basin. The volume displaced due development of this site is minimal and therefore is not included in the stormwater storage calculations.

Stormwater Disposal

All stormwater storage facilities will be designed such that stored runoff will be discharged completely from the facility within 36 hours following the storm event. The basins will be constructed with a gravity bleed-off system which will be sized during final design.

draining to where?

Lowest Floor Elevations

Lowest floor elevations and/or flood proofing elevation(s) are sufficiently high to provide protection from flooding caused by a 100-year storm, and are in accordance with Scottsdale's revised code, chapter 37-Floodplain & Stormwater Regulation.

V. CONCLUSIONS

- The project is mostly within FEMA Zone "X" with a small area of Zone "A".
- The site does not have any Army Corp. of Engineers jurisdictional areas requiring a 404 Permit.
- This project will comply with the National Pollutant Discharge Elimination System (NPDES) program. A Notice of Intent (NOI) will be submitted to ADEQ and an Authorization to Discharge (ATD) letter will be obtained prior to construction. The total area of disturbance is approximately 5 acres.
- This project will pursue a full waiver of stormwater storage requirements in accordance with City of Scottsdale's DS&PM.
- Stormwater storage facilities shall be maintained so as not to cause or contribute to the creation of a public nuisance. At a minimum, maintenance shall include the removal of all debris and sediment from stormwater storage facilities immediately following a storm event.
- All stormwater storage facilities will be designed to drain within 36-hours of the rainfall event.

- Lowest floor elevations and/or flood proofing elevation(s) are sufficiently high to provide protection from flooding caused by a 100-year storm, and are in accordance with Scottsdale's revised code, chapter 37-Floodplain & Stormwater Regulation.

- This Project will not adversely impact drainage conditions on adjacent properties.

APPENDIX A

FIGURES

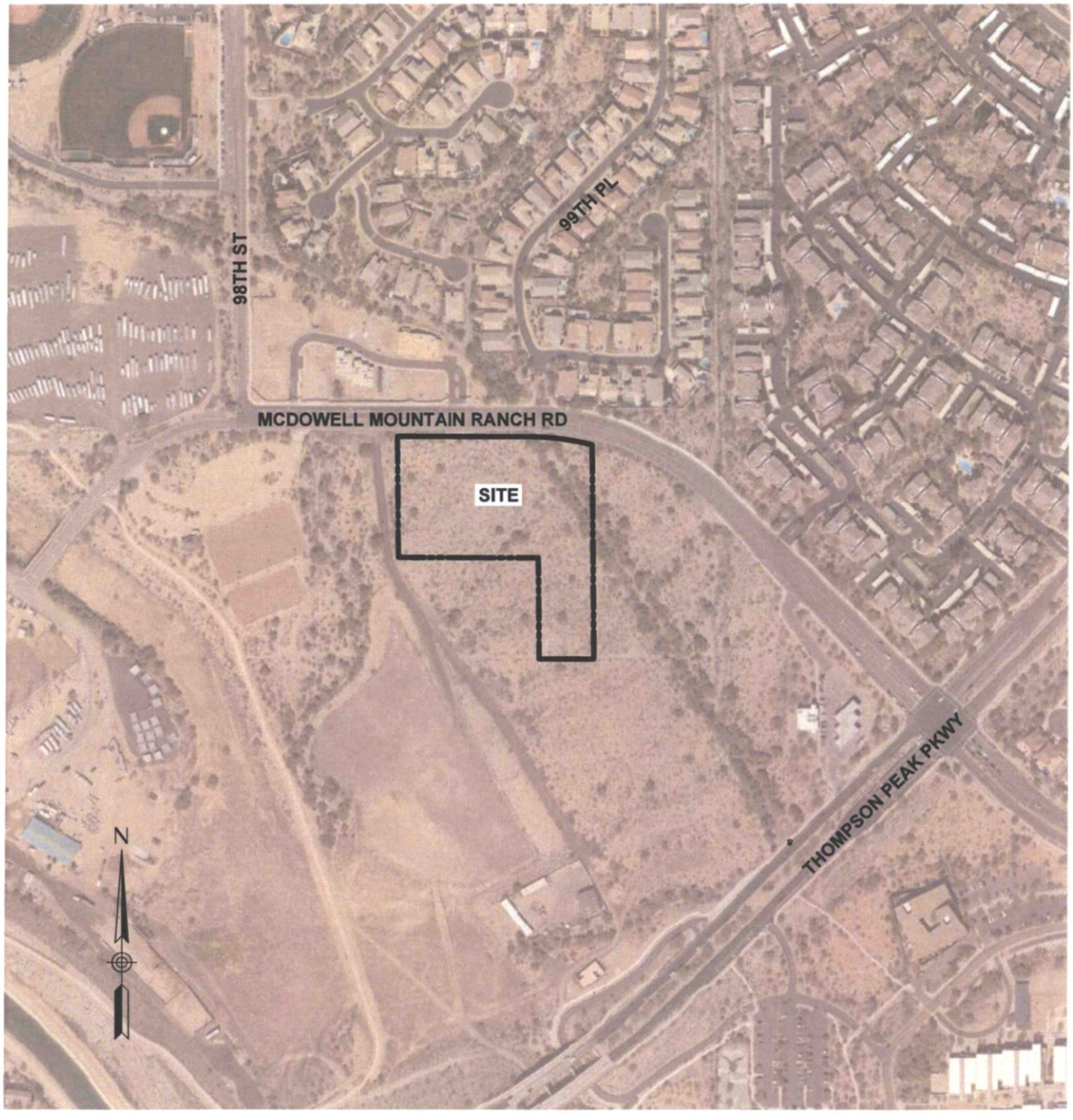


FIGURE 1
LOCATION MAP

National Flood Hazard Layer FIRMette

FEMA

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

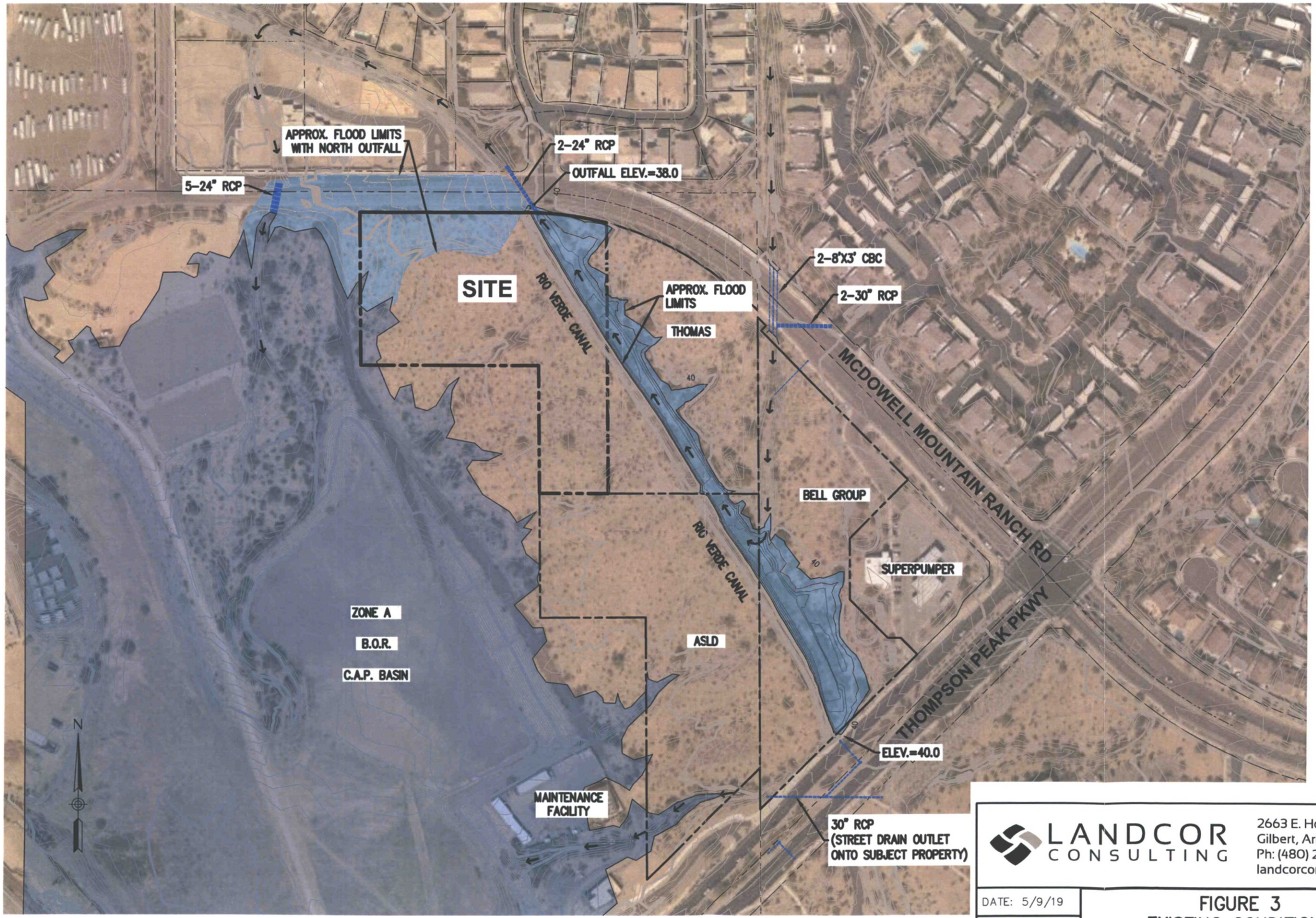
N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 5/10/2019 at 3:05:04 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.



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2663 E. Hobart Street
Gilbert, Arizona 85296
Ph: (480) 223-8573
landcorconsulting.com

DATE: 5/9/19

SCALE: 1"=200'

FIGURE 3
EXISTING CONDITIONS

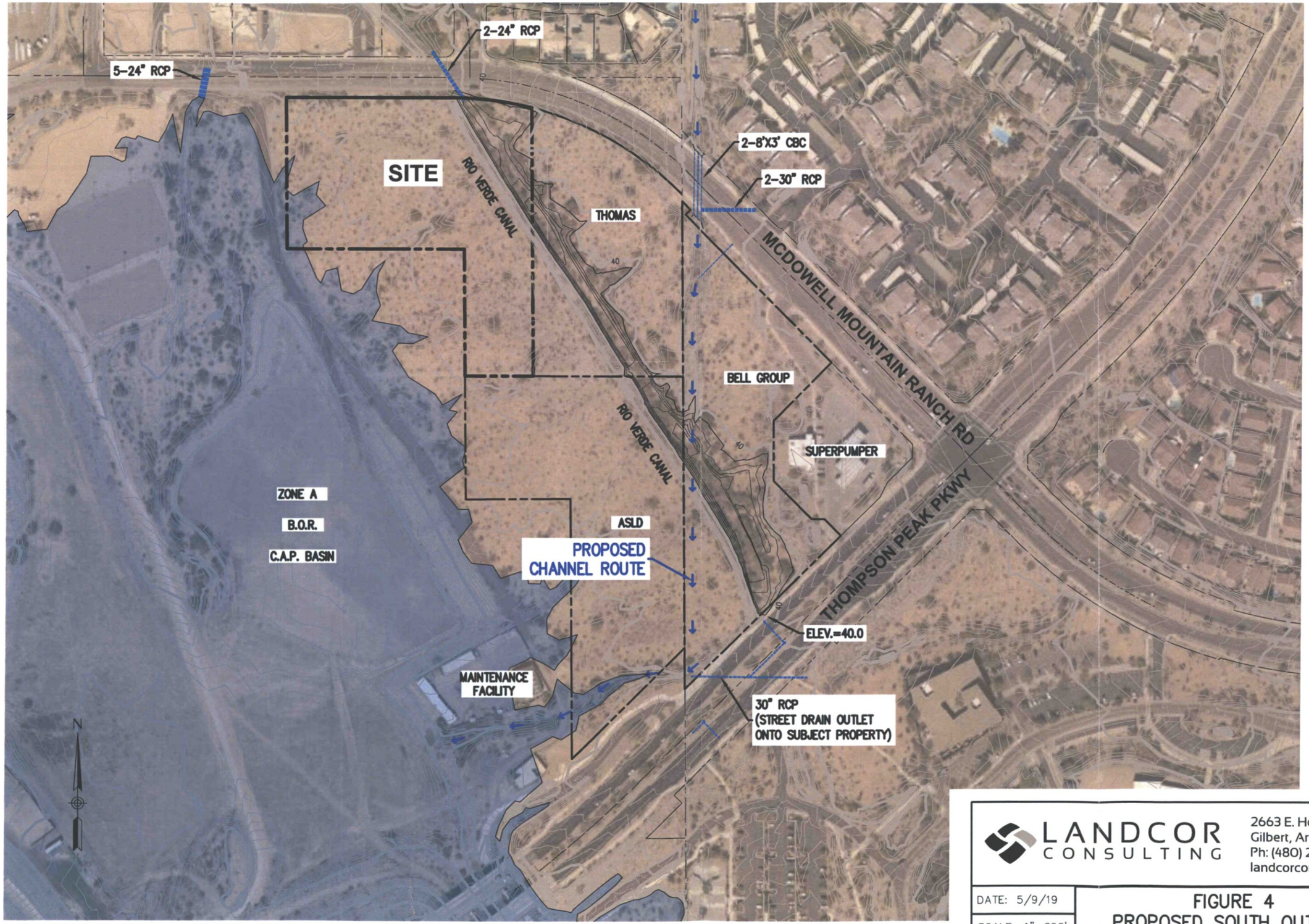

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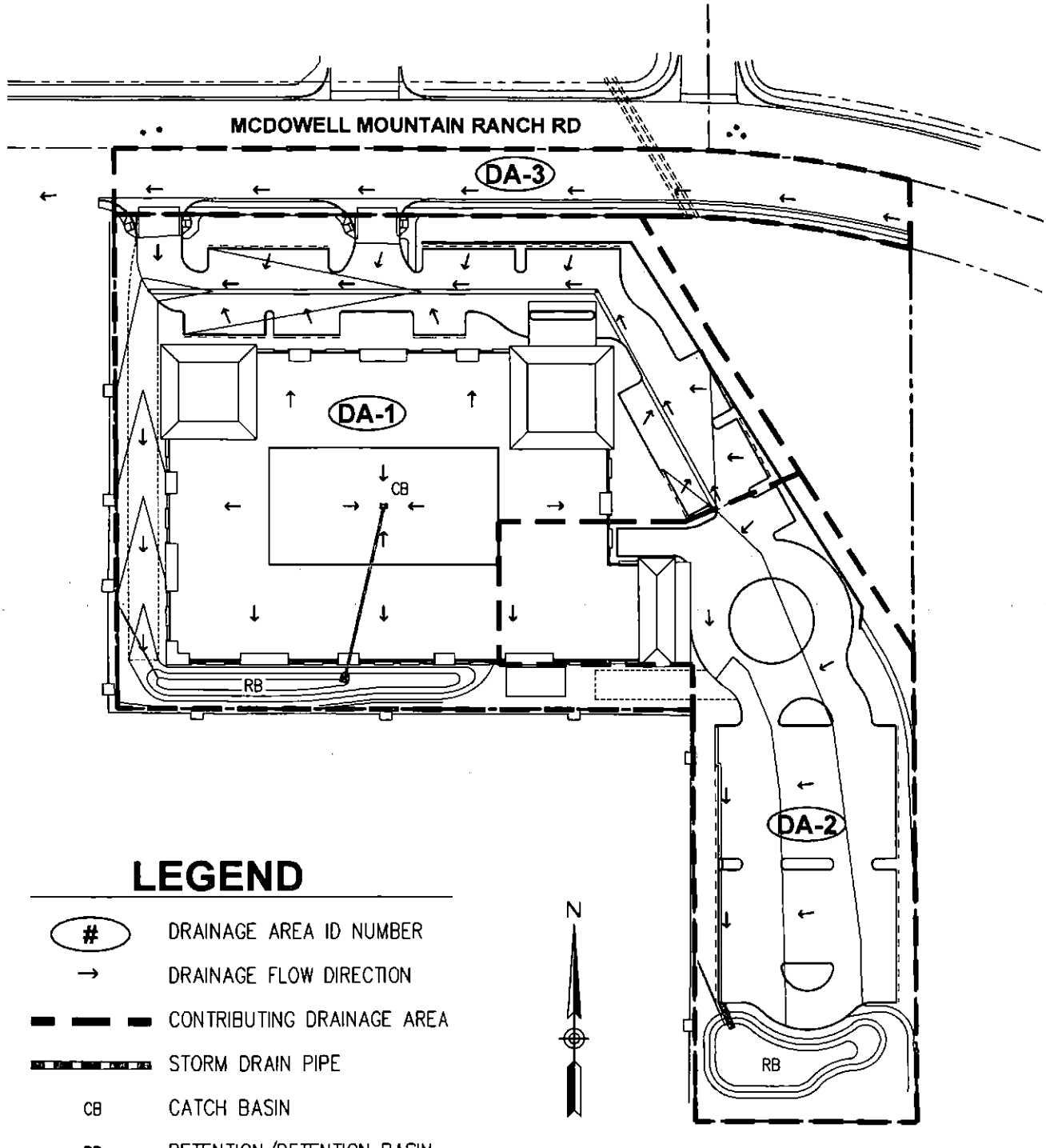
FIGURE 4
PROPOSED SOUTH OUTFALL



LEGEND

#	DRAINAGE AREA ID NUMBER
→	DRAINAGE FLOW DIRECTION
- - -	CONTRIBUTING DRAINAGE AREA
═══	STORM DRAIN PIPE
CB	CATCH BASIN
RB	RETENTION/DETENTION BASIN

LANDCOR CONSULTING
6859 E. Rembrandt Ave, 124
Mesa, AZ 85212
Ph: (480) 223-8573
landcorconsulting.com

SCALE: 1"=100'

FIGURE 5
ON-SITE DRAINAGE AREA MAP

JOB NO. 1617

APPENDIX B

Excerpts from *Southwest Corner Thompson Peak Parkway & McDowell Mountain Ranch Road Preliminary Drainage Report*

by Erie & Associates

Southwest Corner Thompson Peak Parkway & McDowell Mountain Ranch

Preliminary Drainage Report

Prepared for:

George Bell/George Bell III
Land Research and Development, Inc.
18061 North 99th Street
Scottsdale, AZ 85255

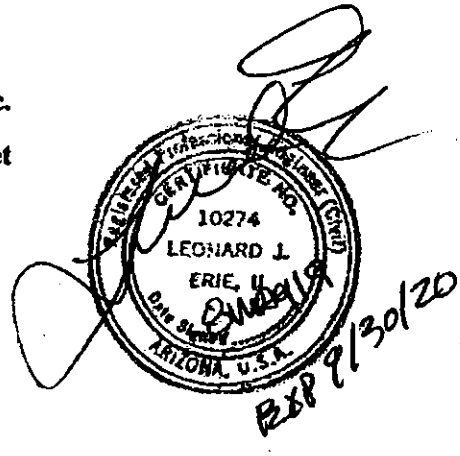
For submittal to:

City of Scottsdale

Case No. 23-ZN-2018

Prepared by:

Erie & Associates, Inc.
3120 North 24th Street
Phoenix, AZ 85016



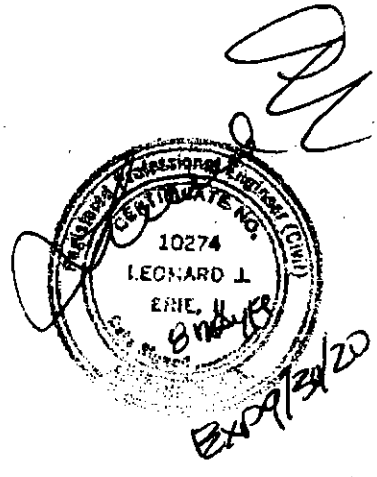
EA #2305.01

May 8, 2019

1.0 Table of Contents **Page**

List of Appendices

2.0 List of Plates and Tables



3.0 Location/Description

The 5± acre project site is located in the City of Scottsdale, Arizona at the southwest corner of Thompson Peak Parkway and McDowell Mountain Ranch Road. The site is a portion of the southeast quarter of Section 5, Township 3 North, Range 5 East of the Gila and Salt River Base and Meridian. See *Plate 1 – Location Map.*

This property is Parcel K of the McDowell Mountain Ranch Development. The property is on an ESL area and will meet current storage requirements for that ordinance.

The site is bisected by the Old Verde Canal which cuts across the site from northwest to southeast. Drainage in the area is generally from north to south and on a much flatter slope from east to west. Modifications to the Old Verde Canal are proposed to route flows south to an existing wash that runs to the CAP Dike Ponding area.

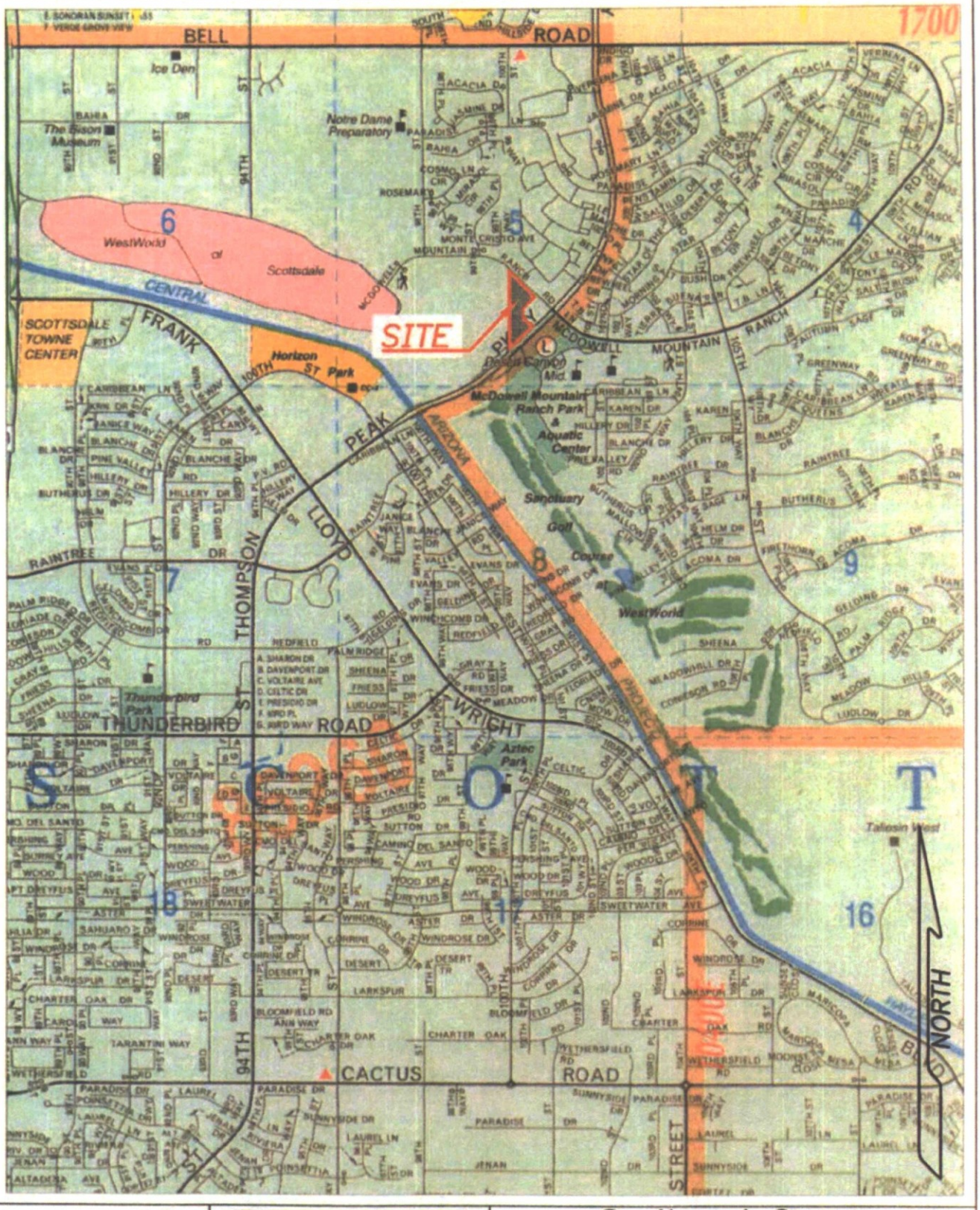
3.1 FEMA Data

The site is located on FEMA Map #04013C1340L dated October 16, 2013. The site is located in a FEMA Shaded Zone "X". A copy of the map is included as *Plate 2 – FEMA MAP.* A FEMA shaded Zone "X" is defined as "an area of 0.2% annual chance flood; area of 1% annual chance flood with average depths of less than one foot or with drainage areas less than one square mile; and areas protected by levees from 1% annual chance flood.

3.2 Drainage Concepts

- Under existing conditions, peak flows leave the site along the west boundary on the north side of the Old Verde Canal. The runoff ponds behind the Old Verde Canal and eventually spills to the west through a breach in the canal at McDowell Mountain Ranch Road.
- For proposed conditions, the Old Verde Canal will be breached. Runoff will be conveyed by a proposed channel that discharges at the southwest corner of the property at the historic location.
- The existing gas station basin will be reconfigured to be located entirely on the gas station site. The approval to do this will be obtained with the final plans.

- This site will provide the greater of pre/post 100 year -2 hour or first flush retention for containment of flows off the service station site.
- The first flush flows from the remaining developed portions of the site will be detained in the existing ponding area behind the Old Verde Canal west of the proposed breach.



JOB NO. 2305.01 DATE: 12/21/2018 SCALE: 1"=2000'	ERIE & ASSOCIATES, INC. 3120 NORTH 24th STREET PHOENIX, ARIZONA 85016 (602) 954-6399	Southwest Corner Thompson Peak Parkway & McDowell Mountain Ranch PLATE 1 – LOCATION MAP

JOB NO. 2305.01 DATE: 12/21/2018 SCALE: 1"=1000'	ERIE & ASSOCIATES, INC. 3120 NORTH 24th STREET PHOENIX, ARIZONA 85016 (602) 954-6399	Southwest Corner Thompson Peak Parkway & McDowell Mountain Ranch PLATE 2 – FEMA MAP

4.0 Hydrology

A hydrologic analysis was completed for this project to determine the offsite flows for existing and developed conditions. The peak flows for the 100-year, 6-hour storm event were calculated using the United States Army Corps of Engineers HEC-1 computer program. Rainfall data is based on the latest NOAA 14 guidelines. Rainfall losses were determined using the Green and Ampt loss rate method and the Clark Unit Hydrograph was used for hydrograph routing. Soil information used in this study was taken from the USDA Soil Conservation Service "Soil Survey of Aguila-Carefree Area, Parts of Maricopa and Pinal Counties, Arizona". See *Appendix A* for hydrologic data and calculations. The methodology used to calculate peak flows is consistent with the requirements outlined in the "Drainage Design Manual for Maricopa County, Arizona". The hydrologic calculations and basin characteristic calculations are included in *Appendix A*. The HEC-1 input/output is included in *Appendix B*.

4.1 Existing Hydrology

An existing conditions hydrologic analysis was completed for this project to determine the peak flows for the 100-year, 6-hour storm event. The existing HEC-1 Input/Output is included in Appendix B. The tributary areas were delineated using a combination of means, including: a USGS quad map, Maricopa County topography, new onsite topo, aerial photos, and field reconnaissance. The model includes an existing ponding area along the Old Verde Canal. The spill out from this reach of the canal is on the west. Ponding elevations are included in Table 5.

There is an existing flow split north of McDowell Mountain Ranch Road at an existing box culvert. Flows out of that split would recombine before splitting out through the opening in the Old Verde Canal at the roadway opening to the west. For that reason, the split was ignored to preclude the possibility of future regrading in the area that would direct more flow to the site. The existing model includes the gas station and the existing basins on the site.

See *Plate 3 – Tributary Map* for tributary areas. See *Table 1 – Existing Conditions Sub-Area Parameters* for the existing hydrologic parameters and *Table 2* for the existing Green and Ampt loss rate parameters. See Plate 4, existing master drainage plan for existing basins onsite and along the Old Verde Canal.

Table 1 – Existing Conditions Sub-Area Parameters

Sub-Area	Area (sq mi)	Length (mi)	Adjusted Slope (ft/mi)	Tc	R
SA-01	0.024	0.19	157.9	0.148	0.099
SA-02	0.090	0.48	129.2	0.235	0.162
SA-03	0.002	0.06	181.8	0.078	0.079
SA-04	0.001	0.06	181.8	0.080	0.120
SA-05	0.007	0.11	136.4	0.196	0.176
SA-06	0.009	0.10	10.0	0.415	0.324

Table 2 – Existing Conditions Green and Ampt Loss Rate Parameters

Sub-Area	IA	DTHETA	PSIF	XKSAT	RTIMP
SA-01	0.25	0.29	2.75	1.339	45
SA0-2	0.25	0.29	2.75	1.339	45
SA-03	0.10	0.29	2.75	1.497	80
SA-04	0.10	0.29	2.75	1.497	80
SA-05	0.30	0.35	2.75	1.004	15
SA-06	0.30	0.35	2.75	0.995	16

4.2 Developed Hydrology

The developed sub area parameters are included as *Table 3 and, Table 4* includes the Developed Green and Ampt Loss Rate Parameters. The HEC-1 input/output is included in *Appendix B.* The developed model includes the reconfigured gas station basin and storage/pads area basin.

Table 3 – Developed Conditions Sub-Area Parameters

Sub-Area	Area (sq mi)	Length (mi)	Adjusted Slope (ft/mi)	Tc	R
SA-01	0.024	0.19	157.9	0.148	0.099
SA-02	0.090	0.48	129.2	0.235	0.162
SA-03	0.002	0.06	181.8	0.078	0.079
SA-04	0.001	0.06	181.8	0.080	0.120
SA-05	0.007	0.11	136.4	0.166	0.146
SA-06	0.009	0.10	10.0	0.415	0.324

Table 4 – Developed Conditions Green and Ampt Loss Rate Parameters

Sub-Area	IA	DTHETA	PSIF	XKSAT	RTIMP
SA-01	0.25	0.29	2.75	1.339	45
SA0-2	0.25	0.29	2.75	1.339	45
SA-03	0.10	0.29	2.75	1.497	80
SA-04	0.10	0.29	2.75	1.497	80
SA-05	0.12	0.34	2.75	1.042	58
SA-06	0.30	0.35	2.75	0.995	16

4.3 Hydrologic Results

The peak flows are shown on *Plate 4 – Master Drainage Plan* for existing and developed conditions and are in *Table 5-Peak Flows at Key Locations.*

Table 5 – Peak Flows at Key Locations

HEC-1 ID	Description	Flow Existing (CFS)	Flow Developed (CFS)
CP.A	**Peak flow entering the site from the north at McDowell Mountain Ranch Road and the 100th Street Alignment.**	**216**	**216**
CP.B/RB.3&4	**Peak flow entering the site from the east off of the gas station site.**	**3/3**	**8/0**
CP.C	**Peak Flow leaving the site at the Old Verde Canal ponding area**	**226**	**228**
CP.D	**Peak Flow into the ponding area to the south at the Old Verde Canal**	**231**	**233**
RB.6 Ex	**Existing Peak Flow out of the ponding area behind at the Old Verde Canal at McDowell Mountain Ranch Road west of the site**	**152 Ponding WS= 1538.92**	**N/A**
RB.6 Dev	**Peak Flow south through the breach in the Old Verde Canal**	**231**	**233**

The area downstream of the site along the Old Verde Canal outfalls at elevation 1537.00, at the opening in the dike to the west. The existing water surface elevation on the 100 year – 6 hour storm is WS=1538.92 For developed conditions, the ponding area is considered ineffective because the proposed Old Verde Canal breach is designed to carry the entire incoming flow, and minimal attenuation of flow would occur.

A 30" pipe enters the channel at Sec 457. The pipe has a capacity of 52 cfs for a total of 285 cfs. The analysis is in *Appendix A.*

5.0 Hydraulics

The hydraulic analysis for this project was performed using the United States Army Corps of Engineers HEC-RAS Computer Program Version 4.1.0. Developed conditions were analyzed for the study reach. The calculations are included as *Appendix A*. The input/output is included as *Appendix B*. The developed condition includes a new west channel to contain the design flow of 216 cfs.

5.1 Developed Hydraulics

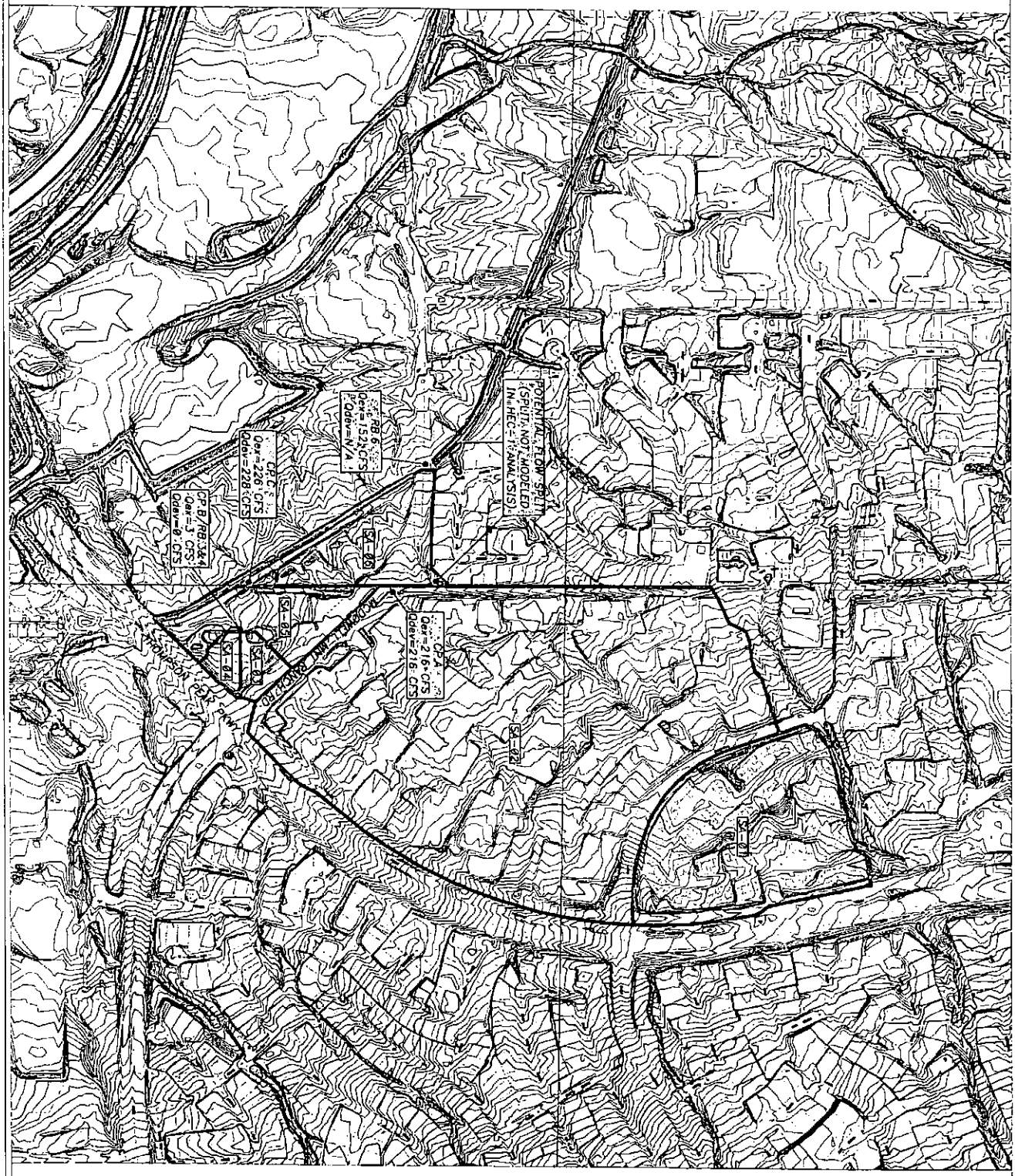
The developed conditions HEC-RAS hydraulic model was constructed using proposed grading from Landcor Consulting. The purpose is to show the proposed and existing buildings are above 100 yr. water surfaces. The Manning's n value is 0.045 for the proposed rock lined channel and 0.06 for the channel downstream of the breach. The 0.06 for the new channel reflects a proposed dense native vegetation liner in the channel. The results are summarized in *Table 1 – Water Surface Elevation Summary* and are shown on *Plate 4 – Master Drainage Plan.*

Table 6 – Water Surface Elevation Summary

HEC-RAS Section ID	Peak Flow CFS	W.S. Elevation (developed)	Channel Velocity (fps)
-80	285	1520.38	6.22
48	285	1523.41	3.86
106	285	1524.18	4.08
162	285	1525.82	4.86
207	285	1526.38	4.38
294*	285	1527.78	5.85
365*	285	1529.31	7.15
457*	285	1532.49	5.46
643	233	1534.39	3.93
796	233	1535.25	4.33
915	233	1536.02	4.21
988*	216	1536.53	4.12
1000*	216	1538.84	6.72
1043*	216	1540.00	6.00
1087*	216	1540.89	6.45
1187*	216	1542.56	4.29
1287*	216	1543.40	4.69
1387*	216	1544.40	4.70

*Rock lined channel areas

The results show that the building along the channel is stepped in grade at approximately section 1187. The water surface elevation is ws=1542.56 and the lower finish floor is ff=1543.00. The upper finish floor is ff=1547.00 and the water surface elevation at the upstream side is ws=1544.40 (Section 1387). Rock sizing for the upper portion of the channel will be done on the final report. The velocity in the lower portion of the channel is approximately 4 fps and will be stable with heavy native desert planting. The connection to the existing channel will be armored with loose stone for approximately 150 feet below the connection point.



ERIE & ASSOCIATES, INC.

35 YEARS OF EXCELLENCE ERIE & ASSOCIATES

THOMPSON PEAK & MCDOWELL MOUNTAIN RANCH

PLATE 3 - TRIBUTARY MAP (C.O.S. TOPOGRAPHY)

PLATE 3
2 OF 2

APPENDIX C

RIO VERDE CANAL – PROPOSED DRAINAGE SOLUTION

Michael P. Leary, LTD
10278 E. Hillery Drive
Scottsdale, Arizona 85255

(480) 991-1111
michaelpleary@cox.net

Date: March 13, 2019

To: Richard Anderson, Scottsdale Stormwater Management

Cc: Ashley Couch, Scottsdale Stormwater Management
Don Gerkin, Scottsdale Stormwater Management
Randy Grant, Scottsdale Planning and Development Services

From: Mike Leary

Subject: **Rio Verde Canal - offsite flow conveyance - proposed solution**

Richard thanks for your continued support to dislodge - literally - the Rio Verde Canal (RVC) logjam. The attached letter is in response to your request for a brief narrative which describes the flooding and impoundment problem, the history of the problem and our proposed solution. **Our goal is to reach an agreement with the City that provides a drainage solution beneficial to all parties.**

The owners of the three affected privately-owned properties on the south side of MMRR from TPP to 98th Street have authorized the submittal of the attached letter, the solution of which remedies the flooding problems on their properties, the northeast portion of the ASLD parcel and McDowell Mountain Ranch Road. The City's support of the proposed solution also eliminates the City's liability caused by the failure to convey off-site flows directly to the BOR Basin as required by the 1992 MMR zoning drainage stipulations and the MMR master drainage plan and to ultimately construct - per the City approved plans for Thompson Peak Parkway - the outfall at the Rio Verde Canal which would have precluded the current drainage problem.

As the drainage issue has been thoroughly examined and discussed, we respectfully request that the City expeditiously approve the proposed solution and method of implementation as this unresolved issue directly affects the scheduled closing of the Spensa/Bell property on March 29th.

Thanking you in advance,

SPENSA ARIZONA XV LLC
THE BELL GROUP LLC

George H. Bell

JAT DOVE CAPITAL LLC

John G. Thomas

WINSTAR PRO LLC

Dr. Stephen J. Weiss

LANDCOR
CONSULTING

6859 E. Rembrandt Ave, #124
Mesa, AZ 85212

March 15, 2019

Mr. Richard Anderson
Stormwater Review Manager
City of Scottsdale
7447 E. Indian School Road
Scottsdale, AZ 85251

Re: **McDowell Mountain Community Storage**
23-ZN-2018
Rio Verde Canal Outfall

The purpose of this letter is to summarize the results of our findings and present a justification for a Rio Verde Canal (RVC) outfall to be located on the subject property. We are requesting staff approval of this Master Drainage concept that will provide the basis for site design and immediate development of the subject property. This Master Drainage concept will also mitigate the negative drainage conditions along the RVC on adjoining properties as well as McDowell Mountain Ranch Road (MMRR).

As shown in Figure 1, storm water runoff from the site and upstream areas northeast of the RVC pond along the north side of the existing embankment from MMRR to Thompson Peak Parkway (TPP). Upstream flows are conveyed through 2-3'x'8 box culverts and since there is no outfall due to the construction of TPP, existing runoff ultimately ponds and reverses direction northwesterly to where the RVC intersects MMRR. From there, minor flows are conveyed northwesterly across MMRR via 2-24" RCP culverts. During a major storm event the culverts capacity is exceeded and storm water overtops onto MMRR, flows onto the Winstar property, and then continues south to the C.A.P. basin.

Maintaining the existing condition negatively affects the adjacent properties and the City of Scottsdale for the following reasons:

1. As previously stated, storm water flows at the existing outfall at MMRR currently exceed the capacity of the culverts in the roadway and during a major storm event results in flooding of MMRR impacting the City and downstream properties and the service road to the Westworld maintenance facility.
2. Upon development, properties would be required to provide compensatory storage for the displaced volume of ponded storm water along the RVC or the ponded areas would have to remain undeveloped.
3. FEMA does not recognize the RVC embankment as a levee and therefore would not recognize its ability to protect downstream properties from potential flooding due to failure of the embankment. Downstream properties would need to consider this flooding potential with any site development.

Construction of an outfall channel south of the RVC as shown in Figure 2 provides a direct connection for offsite flows to reach the C.A.P. basin thereby eliminating most of the drainage/ponding impacts currently experienced by the adjoining properties. This proposed route would extend the existing riprap channel south of the RVC to the existing wash at the southern tip of the property. This solution provides a direct route for flows, is the most logical route, and is supported by the impacted property owners.

We believe that this Master Drainage concept is the best solution to these local drainage problems for the following reasons:

- The proposed outfall is consistent with the attached MMR 1992 zoning stipulations (Exhibit A), the MMR Master Drainage Plan and other previous hydrologic/hydraulic studies in the area. We are proposing to convey the water south directly to the C.A.P. basin as recommended in the MMR Master Drainage Plan Option 1 (Exhibit B).
- There is adequate capacity downstream.
- Construction of the outfall has been planned/designed but never constructed per the following attachments:
    1. MMR Master Drainage Plan (Exhibit B)
    2. Giant Gas Station (Exhibit C)
    3. TPP Extension drainage design (Exhibit D)
    4. Romanza at TPP (Exhibit E)
- The existing northwest outfall is not controlled and during a major storm event would cause flooding in MMRR as previously discussed and illustrated in Figure 1. The proposed south outfall would reduce if not eliminate this problem.
- The existing northwest outfall creates significant flooding potential not only on MMRR but also the Winstar property west of the canal south of MMRR. The south outfall route alleviates the problem for the City roadway, the Winstar property owner, and Westworld service road.
- The south outfall to the existing wash solves the compensatory storage volume problem for the property owners and the City.
- There is precedent for utilizing the downstream wash for conveyance. As shown in Figure 1, TPP street drainage is conveyed via a 30" RCP which discharges to the existing wash at the south end of the subject property in the same location as the proposed outfall.
- Storm water would discharge into an existing and historical natural wash system on the ASLD property already designated as Zone A floodplain. This solution provides the northeast portion of the ASLD property the ability to eliminate compensatory storage by eliminating ponding behind the RVC embankment. It also removes flooding potential on the ASLD property that would be caused by failure of the embankment.

March 15, 2019

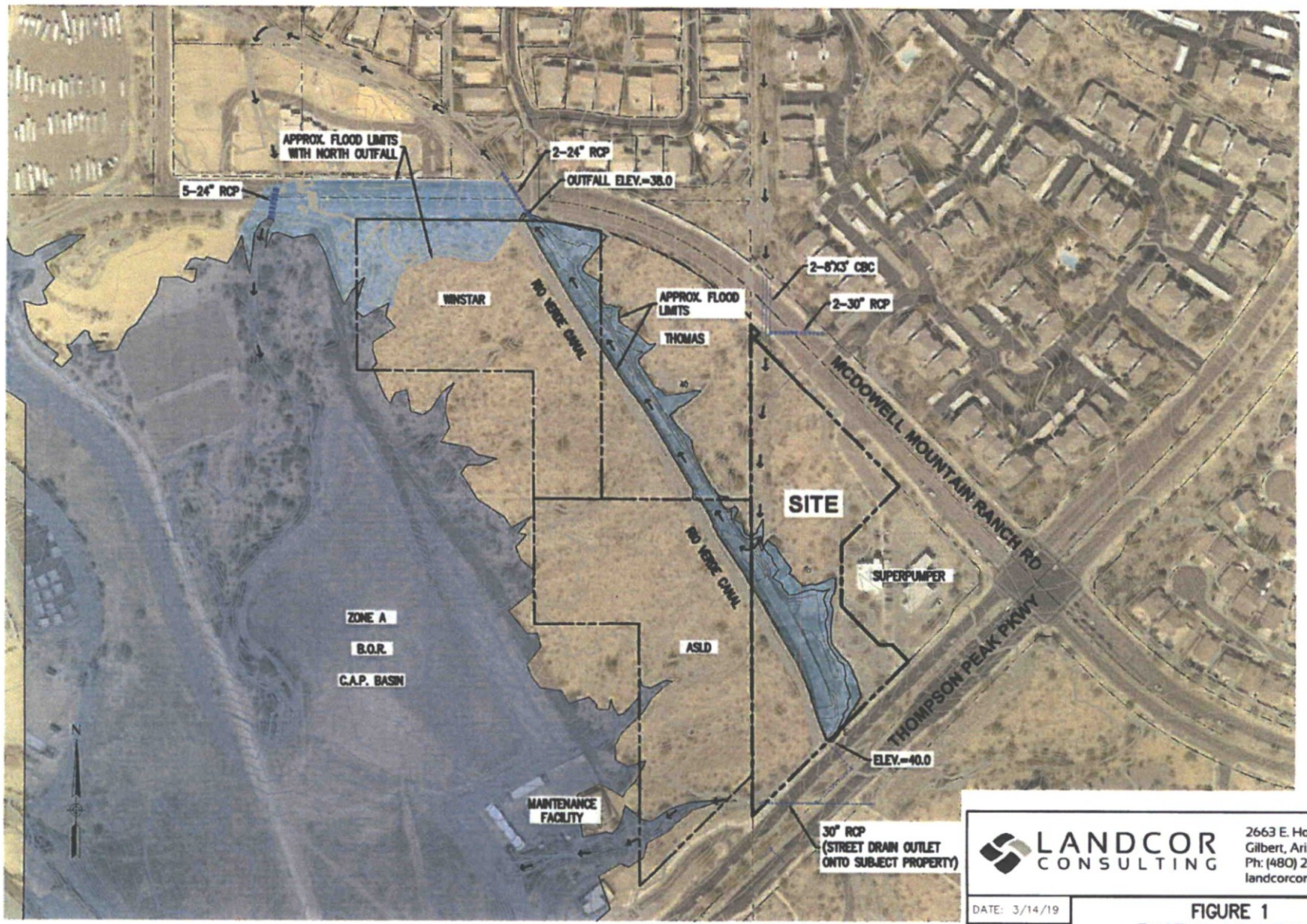
This Master Drainage approach solves local drainage problems impacting the City's roadway and the negative impacts on developing the affected properties. Please feel free to contact me if you have any further questions or need additional clarification (480-223-8573).

Sincerely,

Wade E. Cooke, P.E.
Landcor Consulting, PC

Attachments

Cc: George Bell
George Bell III
John Thomas
Stephen Weiss
Mike Leary
Len Erie
Mike Delmarter



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Gilbert, Arizona 85296
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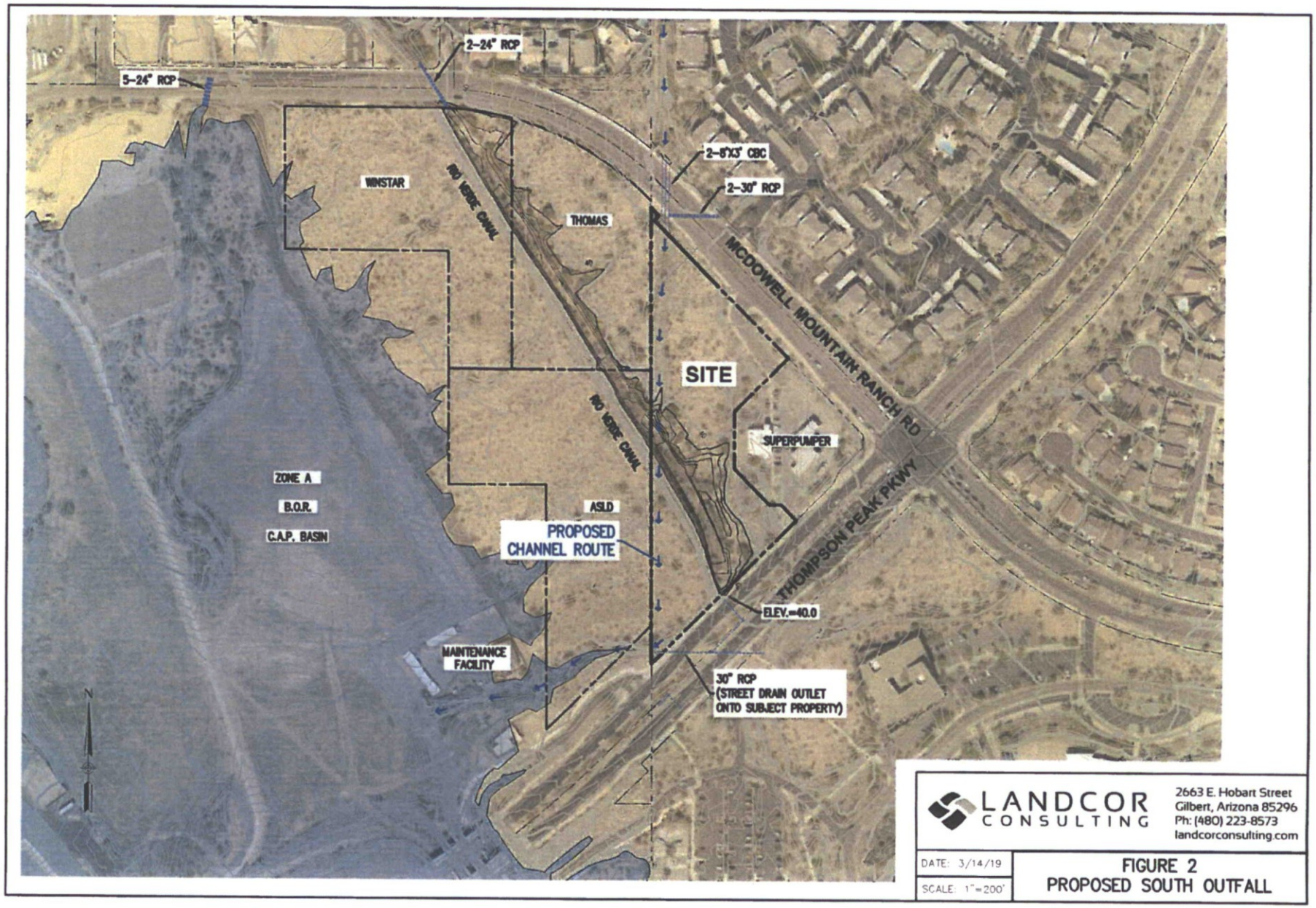
landcorconsulting.com

DATE: 3/14/19

SCALE: 1"=200'

FIGURE 1
EXISTING CONDITIONS



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DATE: 3/14/19
SCALE: 1"=200'

FIGURE 2
PROPOSED SOUTH OUTFALL

DRAINAGE AND FLOOD CONTROL

1. The following stipulations are intended to supplement, but not in any manner reduce or eliminate, the applicants obligations and responsibilities under the City's Floodplain and Drainage Ordinance, Scottsdale Code, Chapter 37. Under the City's Floodplain and Drainage Ordinance, the applicant is responsible for management of all stormwater generated on the property, and all stormwater generated off the property which historically crossed the Property. Management requirements and practices shall be as specified in the Scottsdale Code, and applicable portions of the City of Scottsdale General Plan and Design Procedures and Criteria.

2. The applicant proposes that onsite retention/detention requirements be waived for development within the McDowell Mountain Ranch. Only those areas of McDowell Mountain Ranch development which can fulfill the following requirements will be considered for waivers from the stormwater storage requirements.

   a. The applicant shall show that the runoff has been included in a storage facility at another location. The runoff from this site must be safely conveyed to the other location, generally assumed to be the retention area behind the C.A.P. dike, through an existing watercourse or a man made watercourse which has been adequately designed and constructed to convey at least the 100-year event.

   b. The developer must provide engineering analysis to city staff which demonstrates to the satisfaction of city staff that the watercourse does have the additional capacity and the potential for flooding downstream properties won't be increased.

3. In lieu of providing stormwater retention/detention, in those areas which meet the criteria set forth in 2a and 2b above, the applicant shall contribute services, construction, or cash fees to be applied to the design and construction of community off-site drainage and flood control facilities. In-lieu contributions must be designated and agreed upon by the city and the applicant prior to issuance of permits. In-lieu fees will not be required if the applicant fulfills the requirements of items 2a and 2b above by constructing facilities which safely convey stormwater falling on the subject property and stormwater which historically crossed the property to regional retention/detention basins.

4. Prior to granting of a waiver, and prior to or concurrent with submittal of development plans which would ordinarily require onsite stormwater storage, the applicant shall submit for review and approval analysis, design, and construction documents which will fulfill the requirements of items 2a and 2b above. Included as part of the submittal will be documentation which shows that the downstream property owners have been informed of and agree to the elements of the stormwater management plan which relate to their property. The applicant is responsible for acquiring written authorization and easements from downstream property owners to construct drainage improvements and alter historic flow courses or discharge amounts. The intent is that downstream property owners may authorize acceptance of limited increased pass-through stormwater flows but shall not be required to accept stormwater storage on their properties.

APPROVED
10/1/93 DH

5. The applicant shall prepare a Master Drainage Plan and Report for each of the two major watersheds in accordance with the City's Design Procedures and Criteria with particular emphasis regarding potential alluvial fan flooding on the northwest corner of the property. The two major watersheds are that area west of the McDowell Mountains drainage divide, which shall be defined as the area draining to the Central Arizona Project (CAP) Reach II Detention facility known as Dike No. 4, and that area east of the McDowell Mountains drainage divide, which shall be those areas draining to the Cactus Detention Basin located behind the CAP Canal at the Cactus Road alignment.

6. For the area west of the McDowell Mountain drainage divide the Master Report shall address, but not be limited to, the items lised in Schedule G and the following:

   a. Outline the issues arising from alluvial fan flooding which originates to the north of the subject property. Describe the obligations and alternatives the applicant has for managing the stormwater.
   b. Through coordination with City of Scottsdale staff, determine the best stormwater management alternative.
   c. Identify steps necessary to implement the management plan, including coordination with other parties/agencies, right-of-way acquisition, construction, funding options, etc.
   d. Prepare and submit cost estimates for the selected alternative, both interim and final construction.

7. For the area east of the McDowell Mountain drainage divide, the Master Plan and Report shall address the following:

   a. Conceptual location, configuration, sizing, and outlet arrangement for stormwater management facilities which comply with Scottsdale Revised Code Section 37-42(12). These facilities shall be designed to capture stormwater runoff from the developed portions of the site and shall not allow runoff from off-site or from undeveloped portions of the property to enter into them.

8. Applicant shall participate with city in the Lost Dog Wash Flood Control Project for that portion of the development located within the Lost Dog Wash watershed. Applicant's participation may consisst of in-kind contributions (including, but not limited to property dedications, engineering, construction) or of payments to city, or a combination of each of these. The dollar amount or in-kind contribution to be provided by applicant shall be determined by considering the following or other relevant factors:

   a. Stormwater runoff that will be caused by the development when completed, compared to runoff from the property in a natural condition.
   b. Percentage of the Lost Dog Wash watershed which is part of the development.
   c. The Lost Dog Wash Flood Control Project: Alternative Feasibility Analysis, Cost Estimate and Benefits Assessment Study ("Lost Dog Wash Study").

   The timing of and type of applicant's contribution shall be detailed in a development agreement, which must be executed within 12 months of acceptance by the City Council of the Lost Dog Wash Study or within 12 months of applicant's submittal of the Master Drainage Plan for the drainage area east of the McDowell Mountains, whichever occurs first.

APPROVED
10/1/93 DH
DATE INITIALS

9. Until a final decision is made on the upstream detention features of the Lost Dog Wash Flood Control Project, the applicant shall plan and maintain open spaces in the vicinity of the west fork of Lost Dog Wash and the east property boundary (near the middle of Section 14, T3N, R5E, Gila and Salt River Base and Meridian), below the 1,850 foot elevation (City of Scottsdale Datum) to accommodate potential future detention facilities. Encroachment into this area shall be detailed in the agreement referenced in Drainage and Flood Control Stipulation No. 8 above.

   The applicant shall also take into consideration in the planning of the infrastructure for this area the potential for detention facilities (damsites and associated storage reservoirs) located at Sites C2, D and E as detailed in the Draft Lost Dog Wash Working Paper for Detention Basin and Channelization Alternatives dated October 22, 1991, revised November 13, 1991.

10. A drainage report fulfilling all requirements of city ordinances and Design Procedures and Criteria shall be submitted with each plat or development plan. Where exceptions to normal city requirements apply, the report shall reference the Master Plan Report, waiver form, or other documents of record which justify the exception.

11. At the time of preliminary plat submittal, the applicant shall delineate the 100-year fully developed conditions flood boundary of, and shall designate as a "special flood hazard area" any watercourse which has a tributary area of 320 acres or larger, or an estimated 100-year discharge of 500 cfs or greater. The "special flood hazard area" shall include the channel and any overbank portion of the floodplain. The "special flood hazard area" may, but is not required to, be expanded to include all or portions of any open space area that jointly utilizes the same space as the watercourse.

12. The U.S. Environmental Protection Agency requires a permit for construction activities which disturb 5 or more acres shall require a permit under the National Pollutant Discharge Elimination System (NPDES). A Notice of Intent (NOI), and a Storm Water Pollution Preventon Plan (SWPPP), must be filed with the Environmental Protection Agency and the City before development permits can be issued. Contact the Stormwater Hotline at (703)821-4823 or Project Review at 994-7887 for more information.

13. A Section 404 permit from the U.S. Army Corp of Engineers may be required for discharges of dredged or fill materials within jurisdictional washes. Contact the Phoenix Regulatory Office of the Corps of Engineers for a jurisdictional determination and further information. Written communication with the State Historic Preservation Officer may be required as part of the 404 permit process.

14. As required by city Ordinance, the applicant must submit evidence that all State and Federal permits have been obtained before the city can issue any development permits (this includes 404 permits).

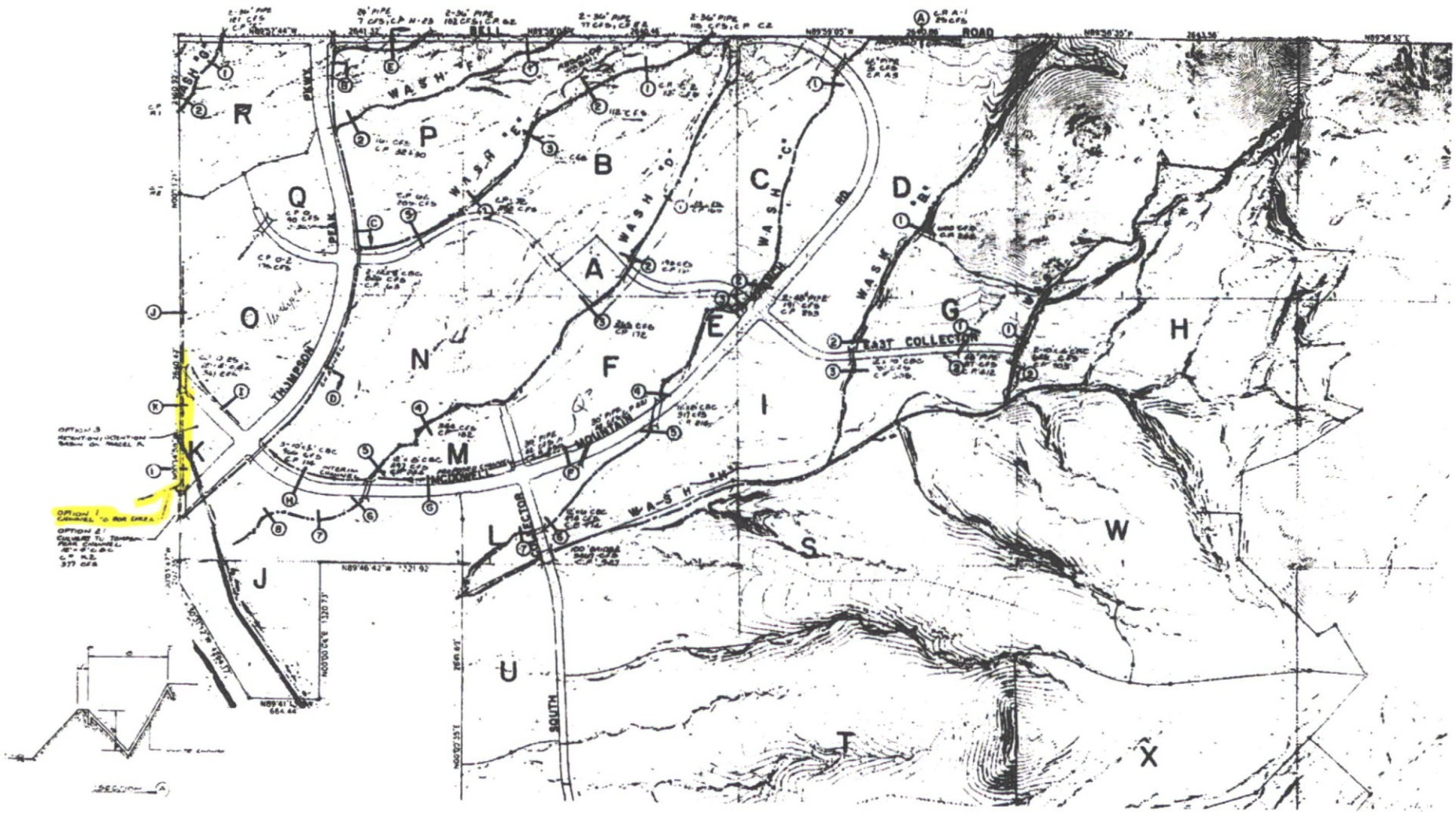
APPROVED

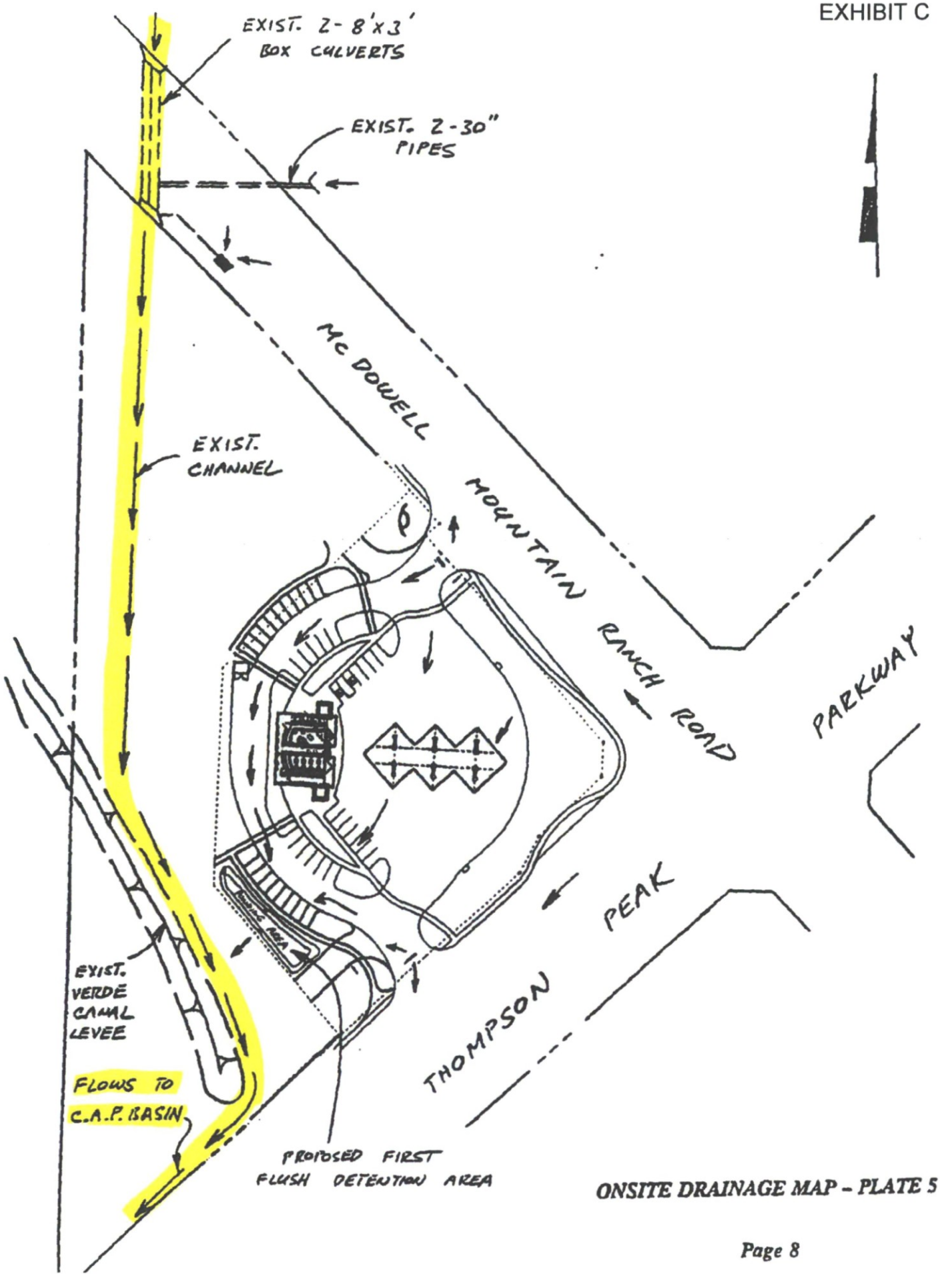
10/1/93 DH

DATE

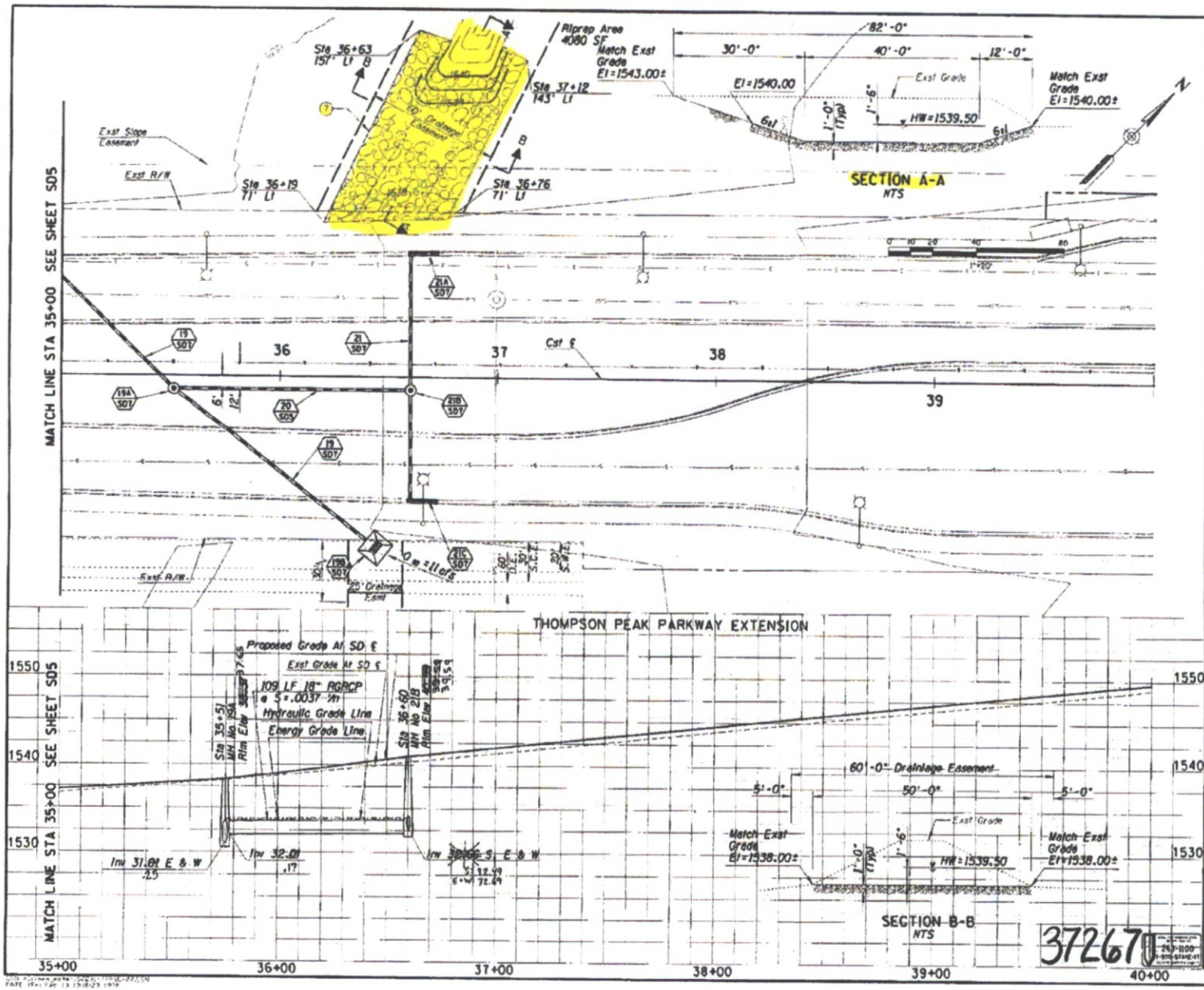
EXHIBIT B

DRAINAGE MASTER PLAN
FOR
MCDOWELL MOUNTAIN RANCH





ONSITE DRAINAGE MAP – PLATE 5



RUST ENVIRONMENT & INFRASTRUCTURE

CATCH BASINS

CB No.	Station	Type	Offset
19B	36+44	Flush, ADOT Dtl C-15.80	18' Rt
21A	36+60	COP Dtl P1567, K14	57.16' Lt
21C	36+60	COP Dtl P1567, K14	57.16' Rt

MANHOLES

MH No.	Station	Type	Offset
19A	35+51	MAG Dtl 424, 520, 522	6' Rt
21B	36+60	MAG Dtl 424, 520, 522	6' Rt

PIPE

Line No.	Station	Size	L (LF)
19	35+51	30" RGRCP	188
20	35+51 to 36+60	18" RGRCP	109
21	36+60	18" RGRCP	112

CONSTRUCTION NOTES

(7) Grade Area To New Contours Shown, Install 1400 S.Y. Riprap. See Section A-A This Sheet

SHEET NOTES:

For Paving Plans, See Sheet P14
For Connector Pipe Profiles, See Sheet SD9
For Water Line Plans, See Sheet W6
For Right-Of-Way Limits, See Sheet P1

STORM DRAIN PLAN STA 35+00 TO 40+00

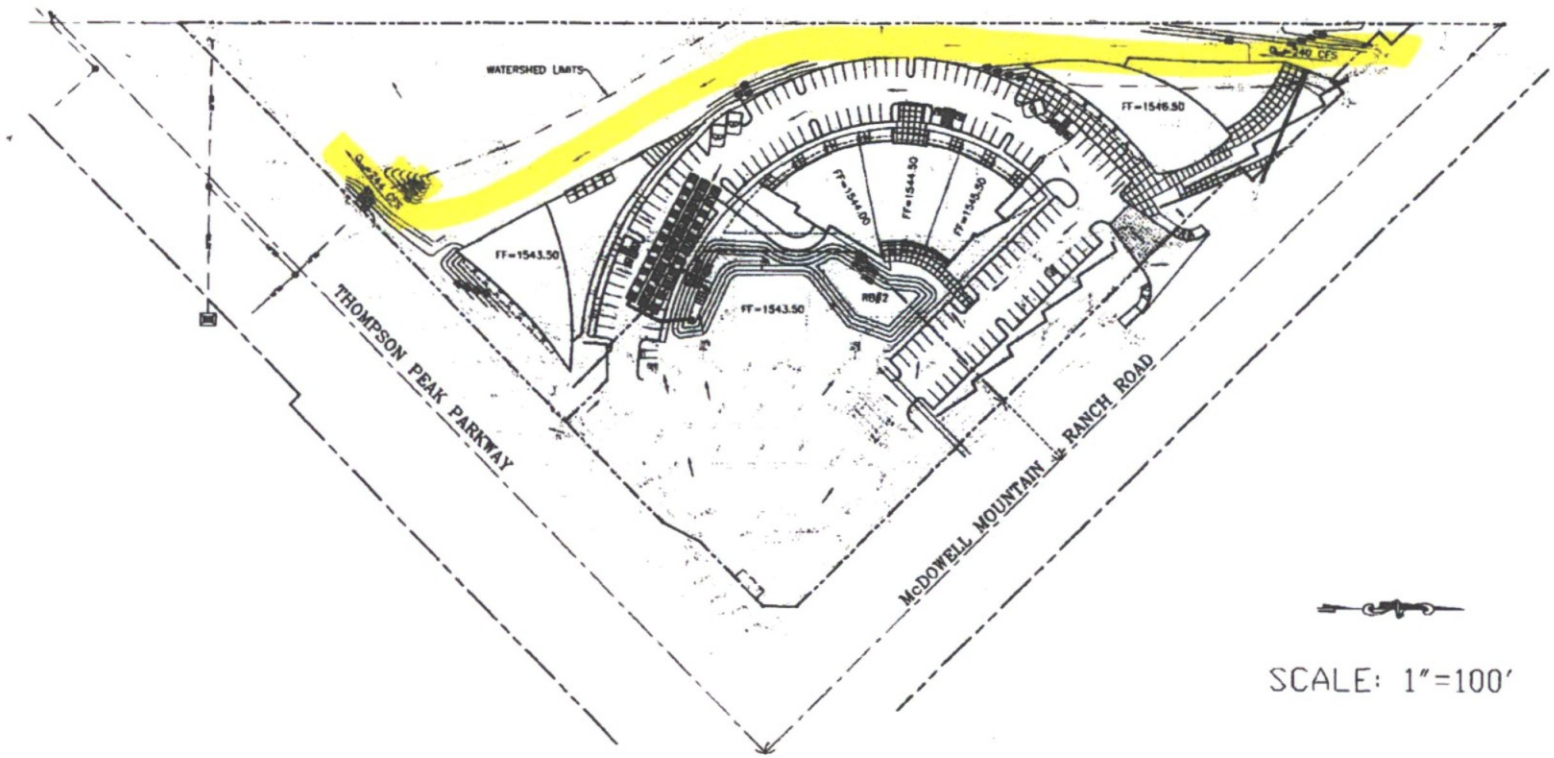
MUNICIPAL SERVICES DEPARTMENT
CAPITAL PROJECT MANAGEMENT
7595 CIVIC CENTER BLVD. SCOTTSDALE, ARIZONA 85251

THOMPSON PEAK PARKWAY EXTENSION
100TH ST TO McDOWELL MOUNTAIN RANCH RD

EXHIBIT D

EXHIBIT E

-DRAINAGE EXHIBIT-
DEVELOPED CONDITION



SCALE: 1"=100'

J. M. GRIFFIN ENGINEERING, INC.
CIVIL ENGINEERING
LAND PLANNING
745 E. MARYLAND AVE., STE. 200
PHOENIX, ARIZONA 85014
T. 602.212.1279 F. 602.212.1553

REVISIONS:
REV. 1
REV. 2
DESIGN BY: J.A.S
DRAWN BY: J.A.S
SCALE:
DATE: JAN. '03
JOB No.: 0236
1of 1

APPENDIX D

RIO VERDE CANAL – CORRESPONDENCE FROM RICHARD ANDERSON

Wade Cooke

Subject: FW: Drainage Proposal - Bell/Thomas/Weiss letter attached
Attachments: 03.13.19 23-ZN-2018 Drainage Proposal to COS.pdf

From: Anderson, Richard
Sent: Thursday, April 11, 2019 10:44 AM
To: 'Mike Leary' <michaelpleary@cox.net>
Cc: Grant, Randy <RGrant@Scottsdaleaz.gov>; Couch, Ashley <ACouch@ScottsdaleAz.Gov>; Clack, Michael <MCLACK@scottsdaleaz.gov>; Venker, Steve <JVenker@Scottsdaleaz.gov>; McClay, Doris <DMcClay@scottsdaleaz.gov>
Subject: FW: Drainage Proposal - Bell/Thomas/Weiss letter attached

Mike,

Thanks to you and your clients for having prepared and submitting the attached drainage proposal.

We have reviewed the proposal and have the following review comments:

In general, the stormwater management design presented in the proposal is acceptable to the City's Stormwater Management subject to two conditions or stipulations which we have discussed in our past meetings on this issue. The following will provide some clarification and direction on those conditions:

> The first condition is approval by the Arizona State Land Department (ASLD) for impacts to their parcel located downstream of the proposed outlet channel. The proposal would result in significant increases in stormwater flows within the existing remnant wash within the ASLD parcel relative to the existing condition. There currently appears to be little flow within this remnant wash; implementation of the drainage proposal would result in 100-year flows of over 200 cubic feet per second within this wash. However, based on a cursory analysis, this existing remnant wash would likely contain the proposed 100-year flows within the banks of the wash due to its size and depth. With respect to process and the required work relating to obtaining State approval, the City is willing to assist in conversations and meeting with the State on this issue, but the developments/parcels will need to make the application to the state.
>
> The second condition would be approval by Westworld for drainage-related impacts to its facilities in general including the existing maintenance facility crossing of the aforementioned remnant wash including mitigation of adverse impacts to the same. Based on a recent field investigation, the driveway for the maintenance facility appears to be an at-grade crossing. There is also a sewer line with manhole, a potable water line and non-potable water line contained within the crossing that would be affected by increases in flows. An exhibit of the area from the City's LIS showing these facilities is provided below. Additionally, this condition would need to address potential adverse impacts to these utilities in general. Again, the submitted drainage proposal would significantly increase flows within the wash and this crossing which could washout the crossing as well as affect the existing utilities. Stormwater staff will plan on contacting or meeting with staff from Westworld to discuss and evaluate this issue to determine needed requirements or mitigation.

With respect to stormwater storage for the properties, consistent with City code, the default stormwater storage requirement for the properties is full (100-year, 2-hour) storage. Since the properties are within the City's Environmentally Sensitive Lands (ESL) area, the development can obtain approval for a storage volume that is reduced from full storage based on providing an analysis that shows no increase in developed condition outflows from the properties from the existing condition. Further, it appear the properties could pursue a full waiver of stormwater storage requirements based on waiver criteria 1 which is based on adequate capacity of downstream facilities to convey additional runoff. In the event a full stormwater storage waiver is approved, the properties would need to pay the in-

lieu fee of $3.00 per cubic foot for the volume waived above the pre versus post requirements in addition to the existing volume within the gas station parcel. These requirements and the potential waiver all appear to be consistent with the McDowell Mountain Ranch Zoning stipulations affecting the storage and gas station parcels which were part of McDowell Mountain Ranch. In the event a full stormwater storage waiver is approved, development of the properties would still need to address the first flush requirement by alternative measures that are acceptable to stormwater management. Additionally, if a full stormwater storage waiver is approved, the 100-year flow rates affecting ASLD land and Westworld would be higher than the existing off-site flows affecting the area due to the additional runoff from development; these higher flow rates would need to be considered by the City and State as part of the evaluation of the proposal for impacts to Westworld/City utilities, and State land.

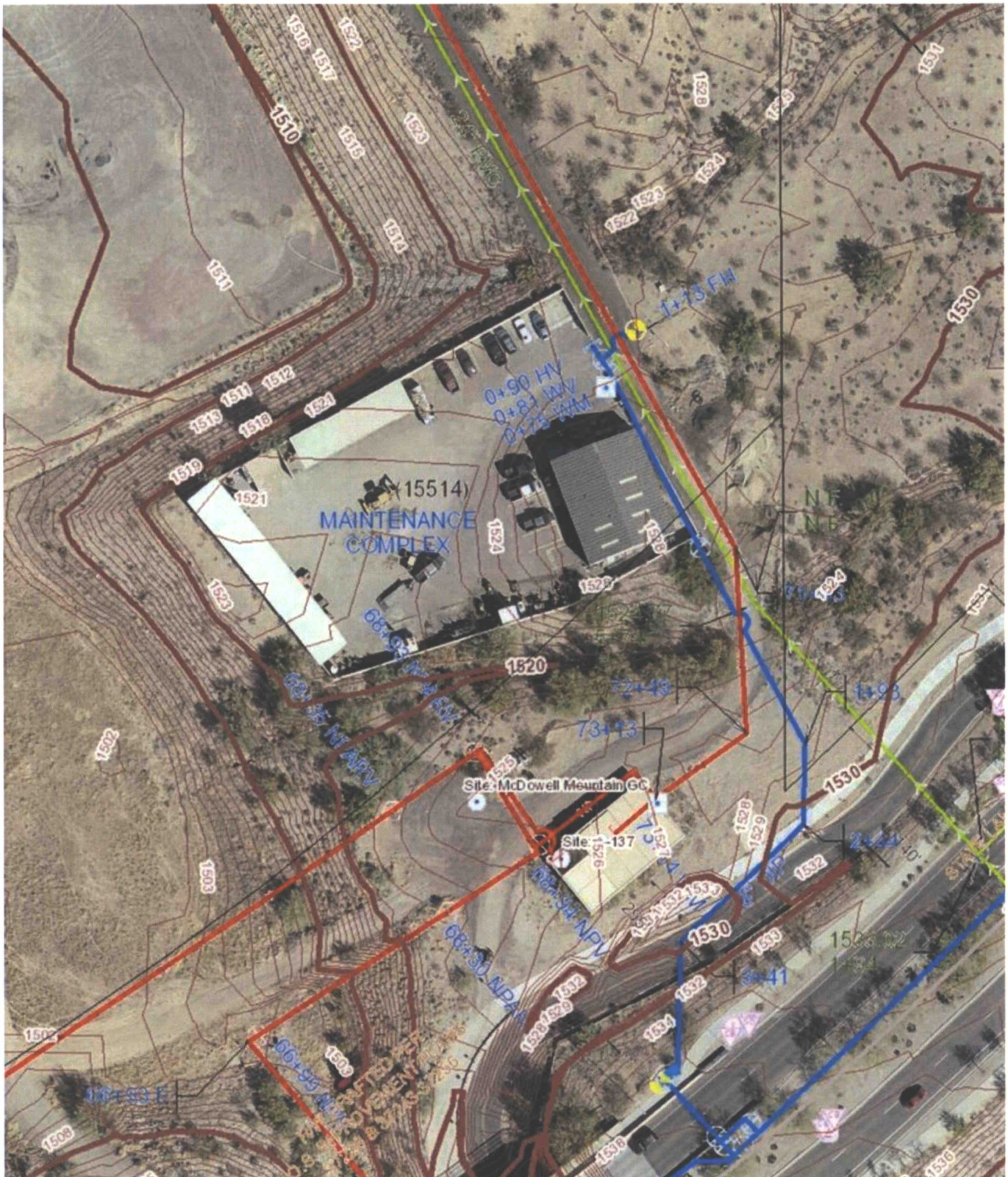
The submitted drainage proposal will need to be further developed into a drainage master plan for the included parcels and submitted to the City for review and approval. The report will need to include and analyze off-site hydrology including any existing flow into the remnant wash within state lands; a preliminary grading and drainage/improvement plan for the Rio Verde Canal breach and proposed channel grading; on-site hydraulics and 100-year floodplain determination for the larger off-site flow through the parcels, State land, and Westworld to the basin downstream; hydraulic and scour calculations for the maintenance driveway crossing for the existing condition and supporting design and documentation for any modifications; an analysis of required stormwater storage volumes and/or a stormwater storage waiver application and supporting calculations.

Please keep in mind that the comments provided at this time are stormwater related only and do not include or reflect the issues or requirements of other review disciplines from the City that may be affected by the proposal. The proposed channel extension appears to be located within existing NAOS; Current Planning will need to weigh in on that issue. The proposed channel extension will also include substantial grading to the Rio Verde Canal for the proposed breach of the canal which, as you are aware, impacts the City's desire to preserve this facility as part of the City's Historical Preservation Program.

Please review and let me know if you have any questions or need any clarifications.

Thanks again for your patience working with us to resolve this difficult issue.

Richard M. Anderson, P.E., CFM
Stormwater Engineering Manager
Stormwater Management
City of Scottsdale
Phone: 480-312-2729
Fax: 480-312-9202



MAINTENANCE
COMPLEX
(15514)
0+90 HV
0+81 WV
0+75 WM
1+13 FH
Site: McDowell Mountain GC
Site: 1-137
68+30 NPAR
1530
1520
1510

From: mike leary <outlook_59CA1EDED17AAFFC@outlook.com> **On Behalf Of** mike leary
Sent: Friday, March 15, 2019 4:52 PM
To: Anderson, Richard <Rianderson@scottsdaleaz.gov>
Cc: Gerkin, Don <Dgerkin@scottsdaleaz.gov>; Couch, Ashley <ACouch@ScottsdaleAz.Gov>; Grant, Randy <RGrant@Scottsdaleaz.gov>; McClay, Doris <DMcClay@scottsdaleaz.gov>; george bell <ghbell@landrd.com>; George H. Bell III <george.bell@landrd.com>; John Thomas <thomasjg@cox.net>; steve weiss <sweiss5@cox.net>; Macey Weiss, Esq <weiss@vestmontinc.com>; Jim Elson <j4747e@aol.com>
Subject: Drainage Proposal - Bell/Thomas/Weiss letter attached

Richard attached is the drainage proposal prepared by our civil engineer in concert with Len Erie and supported by the three affected property owners.

As stated in the cover letter please review with your staff and let us know ASAP how the City can help reaching a mutually beneficial solution and method of implementation as the scheduled closing on the storage property is fast approaching

Thanks! ML

Mike Leary
Michael P. Leary, LTD
Commercial Real Estate Development Consulting

10278 East Hillery Drive
Scottsdale, AZ 85255
(c) 480.991.1111

APPENDIX E

STORMWATER STORAGE CALCULATIONS

MMR Commons
STORMWATER STORAGE CALCULATIONS

5/10/2019

STORAGE VOLUME REQUIRED:

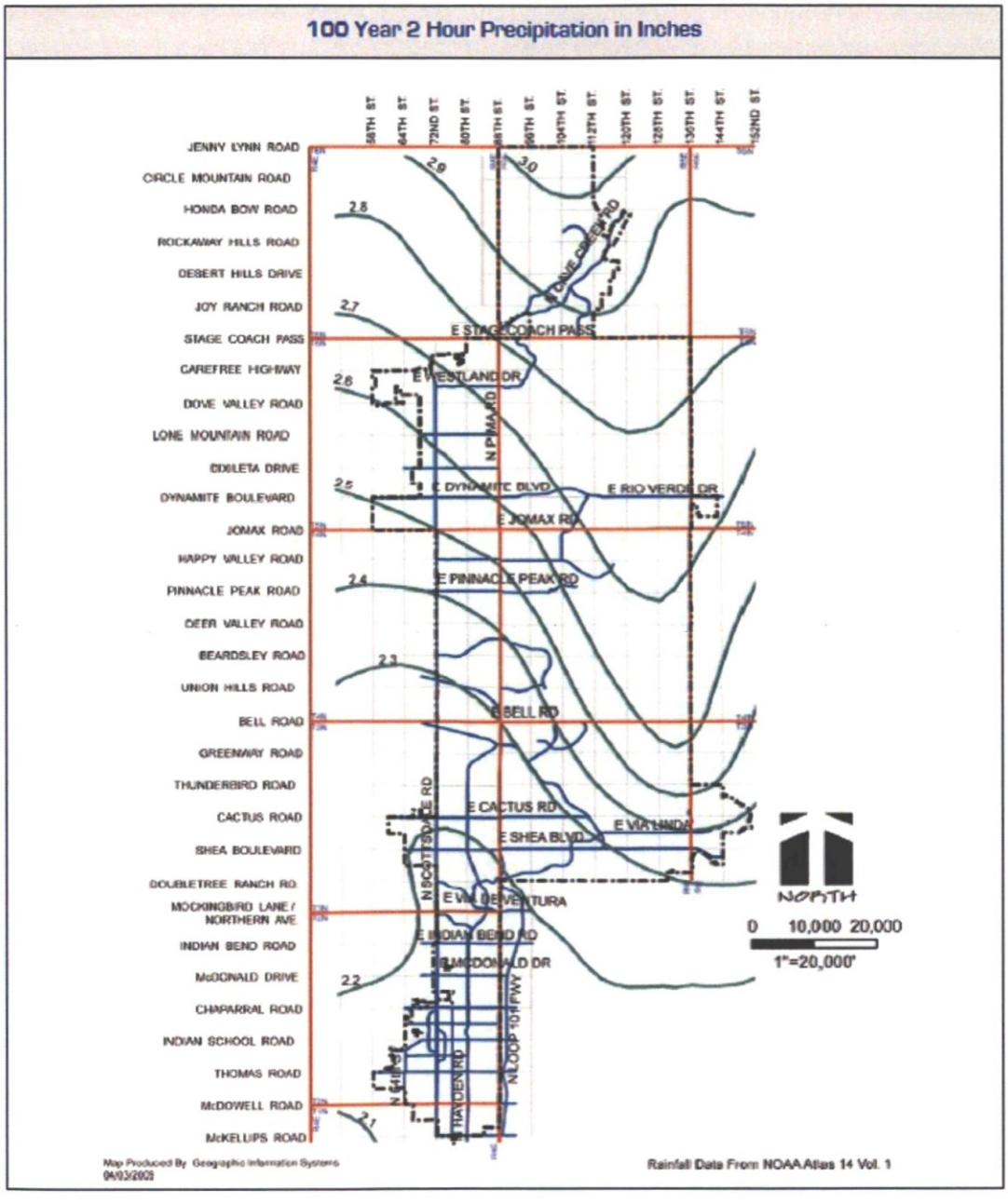
	Area (S.F.)	Area (AC.)	Pre/Post Vr Volume (C.F.)	First Flush Vff Volume (C.F.)
DA-1	127,689	2.93	10,296	5,320
DA-2	73,158	1.68	5,899	3,048
DA-3 (Street)	24,440	0.56	1,971	
Area (gross)	225,287	5.17	**18,166**	**8,369**

Cpre =	0.45
Cpost =	0.86
Cpre/post =	0.41 (0.86 - 0.45)
Cff =	1.00
P =	2.36 inches
Pff =	0.50 inches
V =	(P/12) x A x C

STORAGE VOLUME PROVIDED:

Contour Elevation	Area (S.F.)	Avg. Area (S.F.)	Depth (FT)	Vp Volume (C.F.)
Retention Basin (DA1)				
27	5,118			
26	2,724	3,921	1.0	3,921
25	864	1,794	1.0	1,794
				5,715
Retention Basin (DA2)				
31	5084			
30	3,829	1,255	1.0	1,255
29	2,457	3,143	1.0	3,143
				3,143
			Total Volume (Vp) =	**8,858**
		Waiver Volume =	**Vr - Vp =**	**9,308**

ISOPLUVIALS



APPENDIX F

STORMWATER STORAGE WAIVER

Request for Stormwater Storage Waiver

CITY OF SCOTTSDALE

City of Scottsdale Plan/Case Numbers:

____ - DR - ____ ____ - PP - ____ PC# ____

Requests for stormwater storage waivers are reviewed as part of case submittals for the associated project. This form should be included in the preliminary drainage report with the applicant's portion completed. The preliminary drainage report shall include supporting documentation and analysis as needed to support the requested wavier.

Date 5/11/19 Project Name McDowell Mountain Ranch Commons

Project Location 9909 E McDowell Mountain Ranch Road

Applicant Contact Wade Cooke, P.E. Company Name Landcor Consulting

Phone 480-223-8573 E-mail wade@landcorconsulting.com

Address 6859 E. Rembrandt Ave, #124, Mesa, AZ 85212

Waiver Criteria

A project must meet at least one of three criteria listed below for the city to consider waiving some or all required stormwater storage. **However, regardless of the criteria, a waiver will only be granted if the applicant can demonstrate that the effect of a waiver will not increase the potential for flooding on any property.** Check the applicable box and provide a signed and sealed engineering report and supporting engineering analysis that demonstrate the project meets the criteria and that the effect of a waiver will not increase the potential for flooding on any property.

If the runoff for the project has been included in a storage facility at another location, the applicant must demonstrate that the stormwater storage facility was specifically designed to accommodate runoff from the subject property and that the runoff will be conveyed to this location through an adequately designed conveyance facility.

It should be noted that reductions in stormwater storage relating to

☑ 1. The development is adjacent to a conveyance facility that an engineering analysis shows is designed and constructed to handle the additional runoff from the site as a result of development.

☐ 2. The development is on a parcel less than one-half acre in size.

☐ 3. Stormwater storage requirements conflict with requirements of the Environmentally Sensitive Lands Ordinance (ESLO).

For a full storage waiver, a conflict with ESLO is limited to:

- Property located in the hillside landform as defined in the city Zoning Ordinance
- Property in the upper desert landform that has a land slope steeper than 5% as defined in the city Zoning Ordinance
- Property within the ESL zoning overlay district where the only viable location for a stormwater storage basin requires blasting

This full waiver only applies to those portions of property meeting one of these three requirements.

100-year/2-hour storage is allowed, but not required for redevelopment projects and development within the ESL zoning overlay. Rather, these projects must store enough stormwater to attenuate post-development flows to predevelopment levels, considering the 10- and 100-year storm events (S.R.C. Sections 37-50 and 37-51).

By signing below, I certify that the stated project meets the waiver criteria selected above as demonstrated by the attached documentation.

_____ _____

Stormwater Management Department

7447 E Indian School Road, Suite 125, Scottsdale, AZ 85251 • Phone: 480-312-2500

Request for Stormwater Storage Waiver

CITY OF SCOTTSDALE

City of Scottsdale Plan/Case Numbers:

____ - DR - ____ - PP - ____ PC# ____

CITY STAFF TO COMPLETE THIS PAGE

Project Name McDowell Mountain Ranch Commons

Check Appropriate Boxes:

☐ Meets waiver criteria (specify): ☐ 1 ☐ 2 ☐ 3

Recommended Conditions of Waiver:

☐ All storage requirements waived.

☐ Post-development peak discharge rates do not exceed pre-development conditions.

☐ Other:

Explain: _____

_____

☐ **Waiver approved per above conditions.**

_____ _____

Floodplain Administrator or Designee Date

Stormwater Management Department

7447 E Indian School Road, Suite 125, Scottsdale, AZ 85251 • Phone: 480-312-2500

Request for Stormwater Storage Waiver

CITY OF SCOTTSDALE

City of Scottsdale Plan/Case Numbers:

____ - DR - ___ ____ - PP - ____ PC# _____

In-Lieu Fee and In-Kind Contributions

In-lieu fees are only applicable to projects where post-development peak discharge rates exceed pre-development levels, based on the 10- and 100-year storm events. If the city grants a waiver, the developer is required to calculate and contribute an in-lieu fee based on what it would cost the city to provide a storage basin, sized as described below, including costs such as land acquisition, construction, landscaping, design, construction management, and maintenance over a 75-year design life. The fee for this cost is $3.00 per cubic foot of stormwater storage for a virtual storage basin designed to mitigate the increase in runoff associated with the 100-year/2-hour storm event. The applicant may submit site-specific in-lieu fee calculations subject to the Floodplain Administrator's approval.

The Floodplain Administrator considers in-kind contributions on a case-by-case basis. An in-kind contribution can serve as part of or instead of the calculated in-lieu fee. In-kind contributions must be stormwater-related and must constitute a public benefit. In-lieu fees and in-kind contributions are subject to the approval of the Floodplain Administrator or designee.

Project Name McDowell Mountain Ranch Commons

The waived stormwater storage volume is calculated using a simplified approach as follows:

$V = \Delta CRA$; where

V = stormwater storage volume required, in cubic feet,
ΔC = increase in weighted average runoff coefficient over disturbed area ($C_{post} - C_{pre}$),
R = 100-year/2-hour precipitation depth, in feet (DSPM, Appendix 4-1D, page 11), and
A = area of disturbed ground, in square feet

Furthermore,

$V_w = V - V_p$; where
V_w = volume waived,
V = volume required, and
V_p = volume provided

R = 2.36
ΔC = .41
A = 225,287
V = 9,308
V_p = 18,166
V_w = 8,858

☑ An in-lieu fee will be paid, based on the following calculations and supporting documentation:
In-lieu fee ($) = V_w (cu. ft.) x $3.00 per cubic foot = $26,574

☐ An in-kind contribution will be made, as follows:

_____

_____

_____

☐ No in-lieu fee is required. Reason:

_____

_____

Approved by:

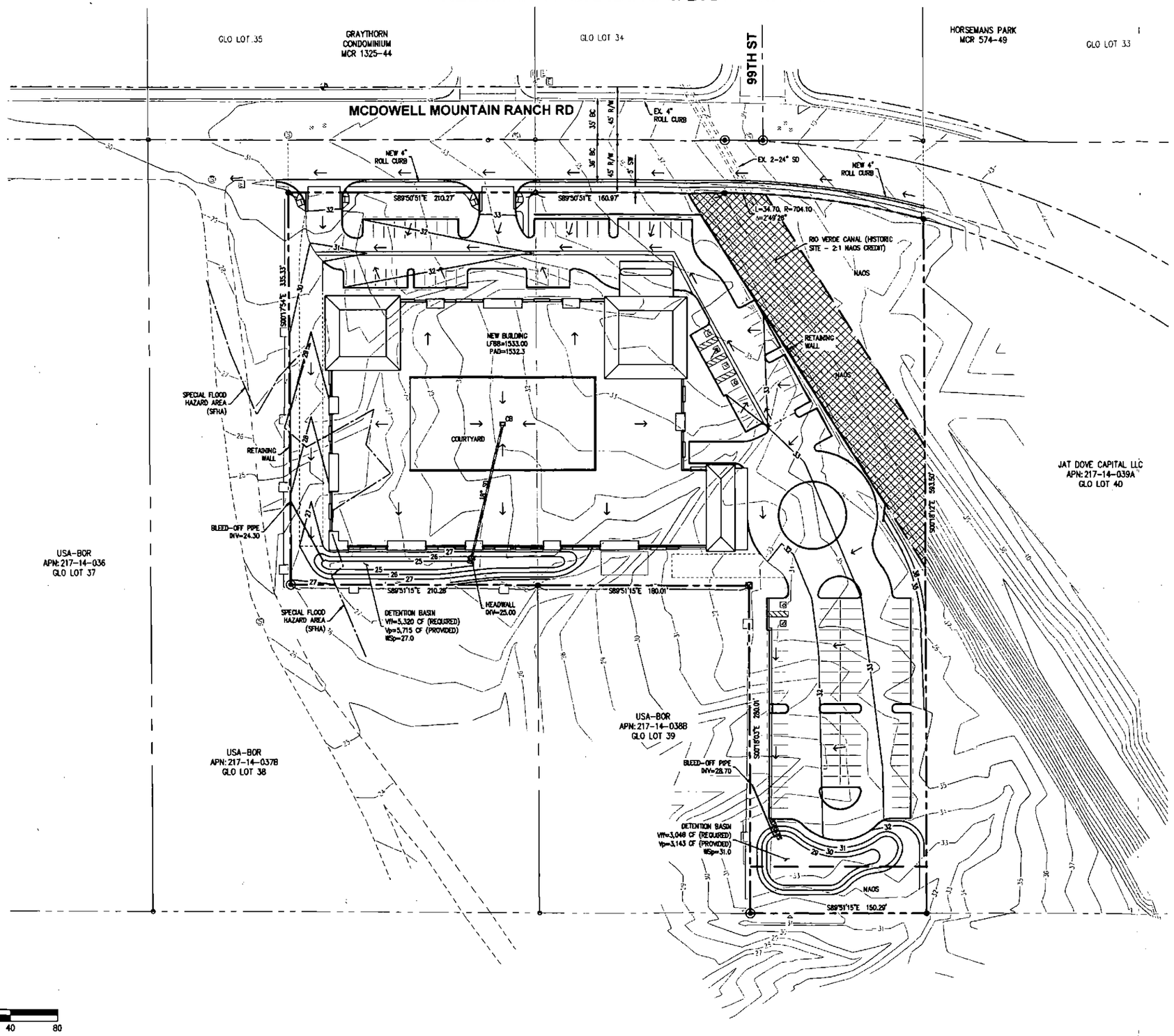
_____ _____

Floodplain Administrator or Designee Date

Stormwater Management Department
7447 E Indian School Road, Suite 125, Scottsdale, AZ 85251 • Phone: 480-312-2500

POCKET FOLDER

PRELIMINARY GRADING & DRAINAGE PLAN



PRELIMINARY
NOT FOR
CONSTRUCTION

WADE E. COOKE — 33981 — REGISTERED PROFESSIONAL ENGINEER — Date Signed 5/10/19 — ARIZONA, USA

RYAN

RYAN A+E, INC.
3900 E. Camelback Road, Ste 100
Phoenix, AZ 85018
602-322-6100 tel
602-322-6300 fax

WWW.RYANCOMPANIES.COM

OWNER

CONSULTANTS

LANDCOR CONSULTING
6859 E. Rembrandt Ave. #124
Mesa, Arizona 85212
Ph: (480) 223-8573
landcorconsulting.com

PROJECT INFORMATION

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Registered Architect under the laws of the State of Arizona

Wade E. Cooke, P.E.

REGISTRATION NO.	DATE
33981	5/10/19

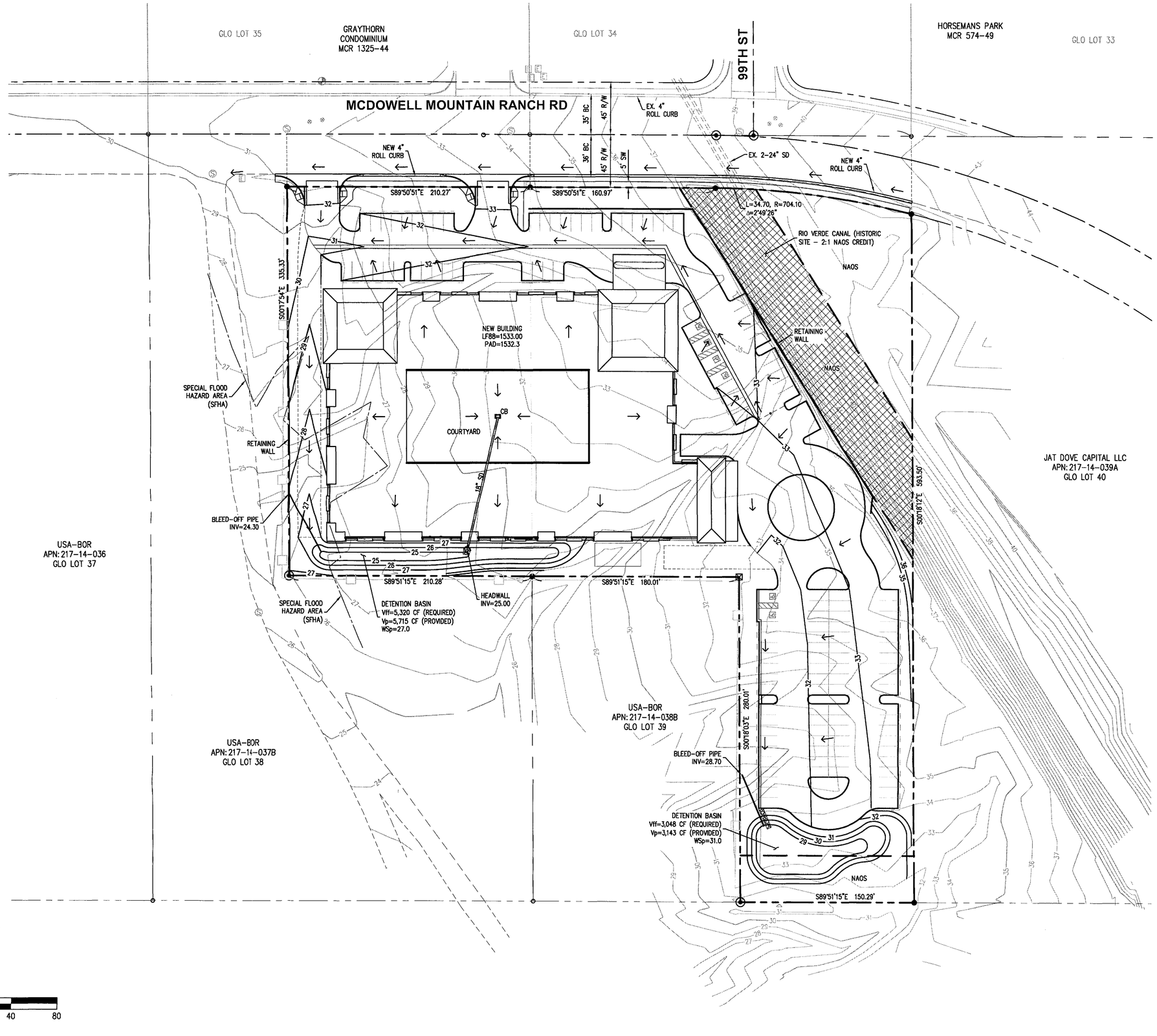
DRAWN BY	CHECKED BY
Author	
JOB NO.	DATE

ZONING 05-2019

ZONING PACKAGE

05.10.19

PRELIMINARY GRADING & DRAINAGE PLAN



PRELIMINARY
NOT FOR
CONSTRUCTION

Registered Professional Engineer (Civil) CERTIFICATE NO. 33981 WADE E. COOKE Date Signed 5/10/19 ARIZONA, U.S.A.

RYAN

RYAN A+E, INC.
3900 E. Camelback Road, Ste 100
Phoenix, AZ 85018
602-322-6100 tel
602-322-6300 fax

WWW.RYANCOMPANIES.COM

OWNER

CONSULTANTS

LANDCOR CONSULTING
6859 E. Rembrandt Ave. #124
Mesa, Arizona 85212
Ph: (480) 223-8573
landcorconsulting.com

PROJECT INFORMATION

Senior Living at McDowell Mountain Ranch
9909 East McDowell Mountain Ranch Road, Scottsdale, AZ

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Registered Architect under the laws of the State of Arizona

Wade E. Cooke, P.E.

REGISTRATION NO.	DATE
33981	5/10/19

DRAWN BY	CHECKED BY
JDM	WEC
JOB NO.	DATE
1617	5/10/19

ISSUE RECORD		
ISSUE #	DATE	DESCRIPTION

99-2019 ZONING

ZONING PACKAGE

05.10.19

PRELIMINARY GRADING & DRAINAGE PLAN

C1